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EFFECTS OF GROUPING FOR INSTRUCTION IN SPELLING
FROM GRADE TWO TO GRADE SIX INCLUSIVE

A Thesis
Submitted to
the Faculty of Graduate Studies
Department of Elementary Education
University of Alberta

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by

Albert Karvonen

July 1966

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies for acceptance,
a thesis entitled "Effects of Grouping for Instruction in
Spelling from Grade Two to Grade Six Inclusive" submitted
by Albert Karvonen in partial fulfillment of the requirements
for the degree of Master of Education.

Date

July 12

ABSTRACT OF THESIS

The purpose of this twelve-week experimental study in the spelling program of the elementary school from Grade Two to Grade Six, inclusive, was to compare the effects of grouping for differentiated instruction in the experimental school with the traditional approach in the control school.

The sample consisted of 808 pupils from two large west-end elementary schools in Edmonton. The experimental school consisted of 412 pupils and sixteen teachers and the control school consisted of 396 pupils and fifteen teachers. To measure spelling achievement, two tests were used, Edmonton Spelling Ability Test II, as a pre-test, and Edmonton Spelling Ability Test IV, as a post-test.

Based on the results of the pre-test, each grade in both schools was divided into three groups: Group A, above average, Group B, average, and Group C, below average in spelling achievement. However, only the experimental school pupils were actually divided into groups and were offered differentiated instruction in spelling. Group A, in addition to being responsible for the regular list of words, received enrichment in the form of words from various subject areas, derivatives, foreign roots, word meanings in depth, synonyms,

antonyms, history of words, and words of special interest. Group B received the regular lessons as outlined in the basic texts. Group C received instruction based on the modified Fernald technique and studied fewer words than the other groups.

Using the technique of multiple linear regression, based on a one-way analysis of covariance, the analysis of data led to the following findings:

1. There was no significant difference in spelling achievement between the two schools.
2. There was no significant difference in spelling achievement between the two schools in each grade.
3. There was no significant difference in spelling achievement between the two schools in each total group (A, B, and C). However, the adjusted treatment mean for Group C (the low achievement group) was significantly different at the nine per cent level and favored the experimental school.
4. There was no significant difference in spelling achievement between the two schools in each group in each grade, except with Group A in Grade Three and Group A in Grade Six. In the former, the results favored the experimental school, whereas in the latter, the results favored the control school.
5. There were significant differences among the

grades in each school. In both schools Grade Four made the least improvement and Grade Six made the most improvement. Grade Two, Grade Three, and Grade Five, in each school made comparable gains.

On the basis of the results from this study it would seem that, for the time and limitations of this study, the type of grouping for differentiated instruction used in this study makes no difference in spelling achievement when compared with the traditional one-group method using a common list of words for everyone. Perhaps, significant differences may have been obtained if the study had been conducted over a longer period of time. The significant differences found among grades in both schools seem to suggest a need to reassess the relative efficacy of the present spelling program. Grade Four does not seem to be doing as well as the other grades. A study similar to this one ought to be done with a greater number of schools over a period of a whole year.

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The question of grouping is of perennial interest in elementary education and the recent emphasis on improved instruction and attention to means of providing for individual differences make it of particular concern. As Shane observes: "...grouping has been one of the most persistent of the problems enlivening and complicating elementary education."¹ However, there is little experimental evidence to support or disprove its usefulness in spelling instruction.

I. THE PROBLEM

Statement of the problem. It was the purpose of this study to explore and evaluate the effects of grouping for differentiated instruction in the formal spelling program of the elementary school from Grade Two to Grade Six, inclusive.

Need for the study. In practice, most classroom teachers in the elementary school today seem to accept the

¹ Harold G. Shane, "Grouping in the Elementary School," Elementary Curriculum, R.E. Chasnoff (ed.) (New York: Pitman Publishing Corporation, 1964), p. 536.

principle of grouping for differentiated instruction in reading as shown in the tables on the following page. This acceptance is largely because of the wide range of reading capability found within a grade or classroom. There is general agreement among authorities in the language arts that there is a high degree of correlation between achievement in reading and achievement in spelling. Kottmeyer states: "Most good readers are good spellers and most good spellers are good readers."²

Therefore, it is reasonable to find just as wide a range in spelling capability as in reading. Recently the Edmonton Spelling Ability Test I was administered by the author to three grade six classes in one school. The findings revealed a range of scores all the way from grade three to grade ten. However, grouping for instruction in an attempt to cope with this wide range of capability in spelling is uncommon. A recent survey of pupil grouping practices by Arbeau showed some grouping in reading but little in spelling.

² William Kottmeyer, Teacher's Guide for Remedial Reading (St. Louis: Webster Publishing Company, 1959), p. 169.

TABLE XXII*

Division I Intraclassroom Grouping by Subjects
as Reported by Teachers

	Gr.I (N=138)	Gr.II (N=131)	Gr.III (N=116)
Reading	77%	78%	72%
Spelling	1%	12%	17%
...

*

A.M. Arbeau, "A Survey of Pupil Grouping Practices in Grades I to XII in Alberta Schools" (unpublished Master's thesis, University of Alberta, 1963), p. 74.

TABLE XXIX**

Division II Gr.IV
(N=107) Gr.V
(N=97) Gr.VI
(N=104)

Reading	53%	43%	43%
Spelling	9%	5%	10%
...

**Arbeau, op. cit., p. 84.

Many language arts authorities agree that in practice teachers use the formal lists far too rigidly, assume every word needs to be studied separately and fail to make adequate provision for individual differences.^{3,4,5} Consequently, the

³ D.H. Russell, Characteristics of Good and Poor Spellers (New York: Columbia University, 1937), p. 89.

⁴ Gertrude Hildreth, Teaching Spelling - A Guide To Basic Principles and Practices (New York: Henry Holt and Company, 1956), pp. 10-13.

⁵ James A. Fitzgerald, The Teaching of Spelling (Milwaukee: Bruce Publishing Co., 1951), pp. 1-10.

above-average spellers often tend to become bored because they are studying words which most of them can spell correctly before study. The word lists would seem to suit the needs of the average spellers reasonably well, but many of the poor spellers are probably hopelessly frustrated. The poor spellers are often given the same list without sufficient concern as to whether the words are meaningful, useful, or part of their spoken vocabulary. Hence, many who lack the necessary background develop poor attitudes, lose interest and lack motivation. In addition, they are forced to learn words by methods which are geared to the average.^{6,7,8,9}

Moreover, the method of presenting words in spelling has been predominantly visual with insufficient attention to the auditory and kinesthetic. Some new spelling series have done much to relieve this problem but a good portion of the responsibility to vary the technique of presenting words remains with the teacher.

⁶ Grace Fernald, Remedial Techniques in Basic School Subjects (New York: McGraw Hill, 1943), p. 181.

⁷ E.W. Dolch, Better Spelling (Champaign: The Garrard Press, 1948), p. 8.

⁸ Hildreth, loc. cit.

⁹ Fitzgerald, loc. cit.

Russell¹⁰ found that poor spellers were usually weak in visual recall, hence the danger of using a predominantly visual method. Likewise, Fernald argues:

The strangest thing about the whole situation is that we tend to emphasize saying of the letters of the word which has been advocated for the sake of the auditory, kinesthetic child is the very method by which it is impossible for him to learn.¹¹

What would seem to be needed is emphasis on a multi-sensory approach so that fewer children are at a disadvantage.

II. DEFINITIONS OF TERMS

Spelling. Spelling as used in this study refers to that part of the language program dealing with the learning of lists of words for purposes of automatic reproduction in writing.

Spelling achievement. Spelling achievement as used in this study refers to the level of performance in recalling the correct forms of words and in reproducing them automatically in writing as measured by the Edmonton Spelling Ability Tests.

¹⁰ D.H. Russell, "A Second Study of Good and Poor Spellers," Journal of Educational Psychology, XLVI (March, 1955), pp. 129-141.

¹¹ Grace Fernald, op. cit., p. 193.

Spelling ability. Spelling ability as used in this study refers to that group of understandings, abilities, and skills possessed by the learner which are involved in the process of recall and reproduction of word forms as measured by the Edmonton Spelling Ability Tests.

Grouping. Grouping as used in this study refers to the process of dividing pupils within a given grade or classroom into groups so as to provide for differentiated instruction in spelling.

Group A. Group A as used in this study refers to the sub-group of superior spellers whose spelling scores on the Edmonton Spelling Ability Test II are well above their expected grade level (see Grouping Procedure, Ch. III).

Group B. Group B as used in this study refers to the sub-group of average spellers whose spelling scores on the Edmonton Spelling Ability Test II are within their expected grade level (see Grouping Procedure, Ch. III).

Group C. Group C as used in this study refers to the sub-group of spellers whose spelling scores on the Edmonton Spelling Ability Test II are below their expected grade level (see Grouping Procedure, Ch. III).

Raw score. Raw score as used in this study refers to the number of correctly spelled words obtained on the test of fifty words.

Grade score. Grade score as used in this study refers to the score obtained by commuting the raw score into an equivalent grade score from the table of norms provided by the Spelling Manual (Edmonton Public Schools), page two.

Control group. The control group as used in this study refers to the 396 pupils, Grade Two to Grade Six inclusive, of Lynnwood School who studied common spelling lists from the authorized texts using the traditional one-group method.

Experimental group. The experimental group as used in this study refers to the 412 pupils, Grade Two to Grade Six inclusive, of Elmwood School who studied spelling from lists as given in the authorized texts, the supplemental lists, and the revised lists using the three-group method at each grade level.

III. HYPOTHESES

The following null hypotheses regarding spelling achievement were tested in this study:

Hypothesis I. There is no significant difference between the experimental school and the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis II. There is no significant difference between the experimental school and the control school in each grade in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis III. There are no significant differences among the grades in the experimental school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis IV. There are no significant differences among the grades in the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis V. There is no significant difference between the experimental school and the control school for each group (A, B and C) in spelling achievement as measured by the

post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis VI. There is no significant difference between the experimental school and the control school in each group (A, B and C) in each grade in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis VII. There are no significant differences among the groups (A, B and C) in the experimental school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Hypothesis VIII. There are no significant differences among the groups (A, B and C) in the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

IV. THE EXPERIMENTAL DESIGN

Two schools, one experimental and the other control, were used to test the hypotheses made for this study. The experimental school included all sixteen classrooms from

Grade Two to Grade Six inclusive. Instruction in spelling was carried on under the three-group method. The superior spellers received enrichment activities in addition to the regular lists and were taught in the usual manner. The average group was also taught in the usual manner but studied the lists as prescribed in the texts. The remedial group received fewer words from the list in the text and were taught by means of a modified Fernald technique.

The control school included fifteen classrooms from Grade Two to Grade Six inclusive. Spelling was taught in the usual manner, the one-group method using common lists for everyone as provided in the texts.

The Edmonton Spelling Ability Test II was administered on January 18, 1966, just prior to the experiment. The results were used to determine the level of achievement and for grouping the students for instruction according to the norms used as criteria and set out in Chapter III. At the conclusion of the experiment, April 29, 1966, the Edmonton Spelling Ability Test IV was given for the purposes of measuring growth and for making comparisons.

The students in the experimental school were compared with the students in the control school according to the group and grade. Comparisons in spelling growth were made

between the two schools including all pupils, between grades, between groups and between each pair of groups within grades. Further comparisons were made among grades in each school and among groups in each school.

V. LIMITATIONS OF THE STUDY

The conclusions in this study are subject to the following limitations:

1. The methods differences between the control school and the experimental school were made of clusters of methods rather than of single, definable techniques. These methods were also open to individual subjective interpretation. Therefore, differences, if found, would be difficult to attribute to a single cause and exact replication of this study might be difficult.

2. The plan for grouping for differentiated instruction was carried on for only twelve weeks. Perhaps, a study such as this carried on for a longer period of time may have produced different results.

3. The experimental school was the same school in which the author had taught for the last four years prior to the experiment; therefore, greater response in the field of spelling might have been expected from the experimental school than if a different school was used.

4. The experimental school used a novel approach whereas the control school used the familiar approach; therefore, the school using the former may have been more highly motivated and thus resulting in greater effort than the latter.

5. The average pre-test grade score for the control school was 5.2 as compared to 4.9 for the experimental school. The experimental and control schools, then, were not comparable at the beginning of the experiment, so far as spelling achievement was concerned.

6. Although the author attempted to select two schools of comparable socio-economic status, it must be recognized that this is an extremely difficult task. The pre-test spelling achievement scores might indicate a discrepancy in socio-economic status. There were some indications from the record of transfers that the population of the experimental school included a greater number of transients than the control school.

7. It was difficult to measure accurately the growth of the exceptional spellers in Grade Five and Grade Six because these students made near-perfect scores on the pre-test. A test with a higher ceiling was needed.

8. The Edmonton Spelling Ability Tests may not have been an accurate measure of spelling ability because the tests were designed for another series of spellers than the

ones authorized for 1965-1966. However, most students have received instruction based on the texts for which these tests were designed and, therefore, in this respect the tests may be reasonably valid.

9. Since many of the enrichment activities dwelt on word meanings, origins, et cetera, many of the benefits for Group A may not have been measurable by a single test as used.

VI. SIGNIFICANCE OF THE STUDY

The matter of grouping is of perennial interest in elementary education and the recent emphasis on improved instruction and attention to means of providing for individual differences makes it of particular concern. As Shane observes: "...grouping has been one of the most persistent of the problems enlivening and complicating elementary education."¹²

A study such as this one may help to provide the elementary teacher in spelling with an alternate plan for coping with the wide range of differences in spelling ability. The results may also help disprove some of the arguments for following the ritualistic plan where all students study the same list. Furthermore, teachers and administrators may

¹²Shane, loc. cit.

have the opportunity to learn and practice new methods and, therefore, this study may prove to be a valuable form of in-service training in supplementing the present program.

CHAPTER II

REVIEW OF RELATED LITERATURE

Spelling has always received considerable attention from authorities in language arts and there seems to be a wealth of literature available. However, there is a paucity of material which applies specifically to the field of grouping for differentiated instruction.

The literature reviewed in this chapter has been organized under five main headings, namely: psychological bases of spelling, selection and placement of words, methods of teaching, grouping for differentiated instruction, and a summary.

I. PSYCHOLOGICAL BASES OF SPELLING

One of the basic assumptions of this study is that there is a definite need to differentiate instruction because individuals vary in their abilities, background, preferred modes of perception, and recall of images. Literature relevant to such basic differences is included.

Neurophysiological research points out that the human intellectual processes function on the bases of a series of plans of action in response to situations. According to Pribram:

These plans of action develop from the individual's reaction with his environment and consist of those parts which are useful in meeting new situations of similar nature. These sensory experiences are probably stored in the form of neural traces. The neural traces form networks of neural memories which are further modified and added to by subsequent use. Psychologists would call this learning.¹

The effectiveness of these plans of action in meeting new situations is dependent on two factors which have tremendous importance to the spelling program. According to Hodges these are:

First, multiple sensory experiences in learning have the advantage of "triggering" appropriate responses to situations because they enable the individual to select various responses upon the basis of one or more sensory stimulations.²

To follow his argument, any child who has been taught to spell through the senses of seeing, hearing and touch is in a better position to recall the spelling of a given word than one who has been limited to just one or two avenues of learning.

The second factor Hodges states:

¹ Karl H. Pribram, "Neurological Notes on the Art of Educating," Theories of Learning and Instruction, The Sixty-third Yearbook of the National Society for the Study of Education. Ernest R. Hilgard, editor (Chicago: The University of Chicago Press, 1964), p. 78.

² Richard E. Hodges, "The Psychological Bases of Spelling," Elementary English, XLII (October, 1965), p. 632.

...The development of effective programs for processing information is more a matter of how much information is contained in each element of the program than in the number of elements which are contained in it. Thus, the content of the spelling programs should include information regarding the basic structural principles underlying the orthography that apply to many words. Such principles, when inductively learned enable the pupil to develop a relatively small set of effective strategies for spelling instead of having to develop nearly as many strategies as there are words to be learned.³

Piaget⁴ in his studies with children speaks of the need for a multi-sensory approach in concept development. Early and frequent multi-sensory experiences are a prerequisite to later development of intellectual abilities. Thus, again, the need for varied techniques in teaching spelling is supported.

A recent study by Hanna and Hanna was an attempt to identify the relationship between the phonemes and graphemes. In this investigation it was found that the structure of the written symbols closely approximates the structure of the oral code. The authors state:

The statistical evidence generated by the research undertaken at Stanford University gives us a priority ranking among those phonological generalizations of

³ Hodges, op. cit., p. 632.

⁴ Jean Piaget, The Stages of the Intellectual Development of the Child. Bulletin, Menninger School of Psychiatry, 1961. pp. 1-6.

position and stress that will predict the spelling of phonemes at a level of about 84 per cent accuracy.⁵

Hanna and Hanna go on to state:

Careful analysis of the structure of our orthography makes it possible and desirable to design a spelling program that will aid the pupil to examine these phoneme-to-grapheme correspondences and induce rules that will elevate the task of spelling to one of rational behavior in contrast to possibly less effective rote memorization.⁶

In support of the more rational program, Ausubel claims:

...New ideas and information can be efficiently learned and retained only to the extent that more inclusive and appropriately relevant concepts are already available in cognitive structure to serve a subsuming role or to furnish ideational anchorage.⁷

How individuals effectively adapt their existing patterns to new situations is dependent on how they have learned to solve various problems systematically. Ausubel then differentiates between rote and meaningful material:

Rote learned materials are essentially isolated from cognitive structure and ... influenced by interfering effects of similar rote materials learned immediately, before or after the learning task... The learning and

⁵ Paul R. Hanna and Jean S. Hanna, "Application of Linguistic and Psychological Cues to the Spelling Course of Study," Elementary English, XLII (November, 1965), p. 754.

⁶ Hanna and Hanna, op. cit., p. 755.

⁷ David P. Ausubel, "Cognitive Structure and the Facilitation of Meaningful Verbal Learning," Journal of Teacher Education, XIV (March, 1963), p. 220.

retention of meaningful materials ... are influenced by ... relevant subsuming concepts⁸ ... and interfering effects have little influence.

Research on forgetting by Underwood seems to support this:

...All forgetting results basically from interference between the associations a man carries in his memory storage system... Two kinds of interference are operating: proactive (by associations stored before this particular one) and retroactive (by others stored after it), and the amount of interference depends on certain other factors, the most obvious of which is the degree of similarity of interfering associations to the one we are trying to recall.⁹

Bloom is much of the same opinion:

...Much emphasis must be placed in the schools on the development of generalized ways of attacking problems and of knowledge which can be applied to a wide range of new situations.¹⁰

Therefore, it seems logical that making spelling instruction more rational through application of phonetic and structural principles will tend to decrease the amount forgotten and help the child become a better speller. Rote memorization of each word is too vulnerable to forgetting.

⁸ Ibid., p. 218.

⁹ Benton Underwood, "Forgetting," Scientific American, CCX (March, 1964), p. 93.

¹⁰ Benjamin S. Bloom, Taxonomy of Educational Objectives, Classification of Educational Goals, Handbook I, Cognitive Domain (New York: David McKay Company, Inc., 1964), p. 40.

In summary, then, recent research evidence in spelling from a psychological point of view seems to indicate that teachers should be more concerned with the development of strategies of learning than with treating each word in the spelling lesson as a separate learning task subjected to rote memorization. Furthermore, these strategies should be appropriate to the level at which the child is functioning. We should work from a variety of sensory experiences with sounds, sights and feelings of words as they are spoken and written to developing ways of attacking words. Words learned in isolation are more apt to be forgotten than those learned in meaningful situations involving the basic generalizations and principles in the structure of the language.

II. SELECTION AND PLACEMENT OF WORDS

Since this study involves in its grouping plan a decrease in the number of words for the remedial group and an increase for the superior group, it becomes necessary to look at some of the studies related to this aspect of providing differentiated spelling instruction. Most of the studies show failure to agree on the most common words above the two thousand mark and to their grade placement. The following studies tend to illustrate this lack of agreement.

Selection. As early as 1915 Ayres¹¹ set out to discover the 2000 commonest English words but later abandoned it as impossible and concluded that the list could be extended only with decreasing reliability after the first fifty.

A frequently used source for almost every elementary text is the Thorndike¹² Word Book. Thorndike used forty-one different sources for the ten thousand most common words chosen from five million words. His later edition in 1944 extended the list to 30,000.

In 1934 Wise¹³ compiled a list of 13,641 words from twenty popular spelling series and found that only 884 words were common to all.

Perhaps the best known and most widely used list is that prepared by Dolch. He used the findings of such people as Gates, Fitzgerald, and Smith. Dolch concludes:

...There really are common words which everyone will need to write and will therefore need to spell, but that number of these is limited. This number may be about

¹¹ Leonard P. Ayres, A Measuring Scale for Ability in Spelling (New York: Russell Sage Foundation, 1915), p. 8.

¹² Edward L. Thorndike, The Teacher's Word Book (New York: Columbia University, 1927), p. iii.

¹³ Carl T. Wise, "Selection and Gradation of Words in Spelling," Elementary School Journal, XXXIV (June, 1934), pp. 754-766.

1000 but ... most teachers ... use the commonest 2000 so as to be sure.¹⁴

An enormous tabulation was done by Horn¹⁵ on one million running words from adult writing. He found that over fifty per cent of communication needs can be satisfied with a mere one hundred words.

Rinsland¹⁶ sampled six million running words of children's writing and came almost to the same conclusion as Horn, that the first one hundred words account for fifty-seven per cent of the grade-eight child's writing needs. The first five hundred words accounted for seventy-nine per cent of a grade six student's writing needs.

Placement. A study by Betts, reported by Hildreth,¹⁷ showed that seventeen authors agreed unanimously in only 6.26 per cent of the total words used, and in grade placement they unanimously agreed on one word.

¹⁴ E.W. Dolch, Better Spelling (Champaign: The Garrard Press, 1942), p. 8.

¹⁵ Ernest Horn, "The Curriculum of the Gifted: Some Principles and an Illustration," Twenty-third Yearbook of the National Association for the Study of Education (Bloomington: Public School Publishing Co., 1924), Part I, p. 87.

¹⁶ Henry D. Rinsland, A Basic Vocabulary of Elementary School Children (New York: MacMillan Company, 1945), pp. 1-21.

¹⁷ Hildreth, op. cit., p. 630.

Fitzgerald¹⁸ tabulated errors from 682,082 running words from children's letters, grade three to grade six inclusive, and came out with a valuable list of 222 spelling demons which can be used for grade placement.

Hildreth¹⁹ maintained that placing a word at just one grade level does not take into consideration forgetting and individual differences.

It is not surprising to learn that there is such lack of agreement on placement when one looks at the criteria used for placement, as outlined by Hodges:

(1) Grouping words according to their utility in children's writing.

(2) Grouping words around some central theme (e.g., Colonial Life).

(3) Grouping words by their visual similarities (e.g., nation, function, invitation).

(4) Grouping words around some spelling rule (e.g., for words ending in y, change the y to i before adding suffixes or the es of plural forms).

(5) Simply grouping words largely at random (e.g., tree, fine, stick).²⁰

¹⁸ James Fitzgerald, "Spelling Words Difficult For Children in Grades II - VI," The Elementary School Journal, LIII (December, 1952), pp. 221-228.

¹⁹ Hildreth, op. cit., pp. 126-146.

²⁰ Hodges, op. cit., p. 630.

III. METHODS OF TEACHING SPELLING

There have been hundreds of studies of methods of teaching spelling. The more recent research, particularly since 1960, seems to suggest a need for change.

Grouping of Words. Many studies have suggested that it is advantageous in teaching spelling to group words according to common elements or difficulties. There seems to be a renewed concern now for such a method of grouping words. Kottmeyer, Ware and Purvis,²¹ to cite one example, have written a whole new series of spellers based on phonetic and structural principles. This is a distinct departure from previous series which tended to give much less attention to the phonetic aspect.

A recent study by Hanna and Hanna at Stanford University reveals the need to group words:

We ought to begin with a linguistic analysis of American English, select those correspondences we wish to present for study, and then prepare a group of study words that illustrate the principle, generalization, or correspondence being taught.²²

²¹ William Kottmeyer, Kay Ware and Neil M. Purvis, Basic Goals in Spelling, Teacher's Edition (Toronto: McGraw-Hill Company of Canada, 1965), pp. i-iv.

²² Hanna and Hanna, op. cit., p. 756.

Hodges,²³ likewise, speaks of the need for analyzing the basic structural properties underlying the spelling of many words.

Robert Hall, a linguist, emphasizes:

...The only way to teaching reading and spelling effectively is to do so on the basis of linguistic facts and to establish in the learner's mind a correlation between graphemes and phonemes.²⁴

As Kottmeyer concludes in his film: "Because the English language has some irregularities does not preclude the usefulness of grouping words according to phonetic and structural generalizations."²⁵

Steps in learning a word. Many studies have been made as to the most efficient method of presenting a word in spelling. The following steps have evolved and are generally agreed upon by such authorities as Hildreth,²⁶ Horn,²⁷

²³ Hodges, op. cit., p. 631.

²⁴ Robert A. Hall, Jr., Sound and Spelling in English (New York: Chilton Books, 1961), p. 33.

²⁵ William Kottmeyer, "The Teaching of Spelling" (filmed reprint of address to Texas Teachers). (St. Louis: Webster Publishing Co., 1959).

²⁶ Hildreth, op. cit., pp. 223-266.

²⁷ Ernest Horn, Teaching Spelling (Washington: Department of Classroom Teachers, American Research Association, National Education Association, 1954), p. 19.

Fitzgerald,²⁸ Dolch²⁹ and Kottmeyer.³⁰

1. Look at the word closely.
2. Pronounce it carefully and listen for the sounds.
3. Attempt to recall how it looks and how it is spelled.
4. Write the word and check it.
5. Repeat the steps if necessary.

The traditional mode of presentation has been predominantly visual and authorities such as Gates,³¹ Horn,³² and Russell³³ claim it should be so. However, spelling authorities such as Dolch,³⁴ Fernald,³⁵ Hanna and Hanna,³⁶ and

²⁸ James Fitzgerald, The Teaching of Spelling (Milwaukee: Bruce Publishing Company, 1951), p. 38.

²⁹ Dolch, op. cit., pp. 188-189.

³⁰ Kottmeyer, Ware and Purvis, op. cit., p. ix.

³¹ Arthur I. Gates, H.D. Rinsland, I.C. Sartorius, and C.C. Peardon, Teachers' Manual to Accompany The Pupils Own Vocabulary Spellers (Toronto: MacMillan Company of Canada, 1952), p. XI.

³² Ernest Horn, "Spelling," Encyclopedia of Educational Research (New York: MacMillan Company, 1960), p. 1348.

³³ Russell, op. cit., pp. 129-141.

³⁴ Dolch, op. cit., p. 169.

³⁵ Fernald, op. cit., p. 182.

³⁶ Hanna and Hanna, op. cit., p. 757.

Hodges³⁷ suggest a greater need for a multi-sensory approach. Psychologists such as Pribram,³⁸ Piaget,³⁹ and Ausubel⁴⁰ would tend to agree with the latter group. They argue it is best to vary your technique of presentation so that each child has a chance of developing the image most clear to him. Such a multi-sensory approach and the resulting opportunity for the child to select his own optimum method would seem particularly important in any program designed to provide for individual differences.

Testing as a teaching device. There is almost overwhelming experimental evidence that the corrected test is one of the most important single factors contributing to achievement in spelling. Horn⁴¹ claims students should concentrate on the words which a pre-test has shown to be in need of study. Other authorities such as Fitzgerald,⁴² Foran,⁴³ and

³⁷ Hodges, op. cit., p. 632.

³⁸ Pribram, op. cit., pp. 80-81.

³⁹ Piaget, op. cit., pp. 1-6.

⁴⁰ Ausubel, op. cit., p. 222.

⁴¹ Horn, op. cit., p. 1346.

⁴² Fitzgerald, op. cit., p. 40.

⁴³ T.G. Foran, The Psychology and Teaching of Spelling (Washington: Catholic Education Press, 1934), pp. 66-67.

McKee⁴⁴ agree.

Schoephoerster⁴⁵ in his study of the variations of the test-study plan concluded that the pre-test was very effective for the superior spellers because it shows which words to study, provided greater motivation, and relieved them for other study. A study by Eichholz⁴⁶ tends to support this.

Spelling rules. Many of the studies mentioned earlier indicate that it is helpful to assist pupils to derive a limited number of generalizations inductively from noting similarities among words. Spending time to teach a good many rules, however, appears to be of questionable value.

Hanna and Hanna⁴⁷ speak of the need for designing a spelling program so that children will induce rules.

⁴⁴ Paul McKee, Language in the Elementary School (Boston: Houghton Mifflin Co., 1934), p. 102.

⁴⁵ Hugh Schoephoerster, "Research into Variations of the Test-Study Plan of Teaching Spelling," Elementary English, XXXIX (May, 1962), p. 462.

⁴⁶ Gerhard C. Eichholz, "Spelling Improvement Through a Self-Check Device," The Elementary School Journal, LXIV (April, 1964), pp. 373-376.

⁴⁷ Hanna and Hanna, op. cit., p. 756.

IV. GROUPING FOR DIFFERENTIATED INSTRUCTION

As mentioned earlier in this chapter, there has been little actual research in this area. No plan for implementing differentiated instruction into the elementary schedule has been proposed, even though every authority seems to agree to its necessity. However, pertinent studies are reviewed here.

A study reported by Dawson⁴⁸ involved fifth graders but those performing at the third-grade level were given third-grade words, those performing at the fourth-grade level were given fourth-grade words, and those performing at the fifth-grade level were given fifth-grade words. Results showed that at the end of the year those on the differentiated program gained a half-year more than the control group which studied the assigned lists irrespective of individual differences.

Another study was done by O'Leary⁴⁹ who conducted an experiment using a small group plan for instruction in

⁴⁸ Mildred Dawson, Teaching Language in the Grades (New York: World Book Company, 1951), p. 239.

⁴⁹ Helen O'Leary, "An Experiment in a Small Group Plan For Spelling Instruction in the Intermediate Grades" (unpublished Doctoral dissertation, University of Connecticut, 1960).

spelling in the intermediate grades. She compared: 1) a small-group plan in which spelling instruction was differentiated according to the pupil's achievement by varying the number and difficulty of words presented for learning and 2) the traditional plan in which the class as a whole studied the prescribed list from the text.

She used an experimental group of 191 pupils and a control group of 192 pupils matched on the bases of mental maturity, chronological age, and spelling achievement. The three sub-groups, high, average, and low, were matched on the basis of achievement scores. The spellers were the sole source of content and the classes had spelling for fifteen minutes a day, five days a week.

In the experimental group the high group studied the entire list and concentrated upon enrichment activities, the low studied the phonetically true words and the average studied the phonetically true words plus six others, the less phonetic and useful. The study lasted for eight months and then an alternate achievement test was given.

When the total experimental and the total control group were compared there was no significant difference in the two plans. But in comparing the sub-groups it was found that the average and particularly the low group did profit significantly from differentiated instruction.

According to this study then it seems that it is better to limit the number of words and concentrate on the more phonetic ones for the less capable spellers.

A number of limitations seem evident. This study was based on the My Word Book series which presents a total of 3,199 words arranged to a large extent on the basis of frequency and random selection. What would happen if this study used a text which presented fewer words and arranged them on the bases of phonetic and structural generalizations? Furthermore, the sample used was chosen merely on the basis of her familiarity with the community.

Lake⁵⁰ did a one-year study comparing a traditional to an individualized method of teaching spelling at the fifth-grade level. She sought answers to questions on spelling growth, attitudes, and written work. A total of eighty-five children were involved (twenty-four children in the experimental group and the rest in the control group). All the children were rated as high, average, and low on the basis of previous scholastic achievement and distributed randomly among four classes. The three control classes used Kottmeyer's text while the experimental class used no

⁵⁰ Mary Louise Lake, "A Comparative Study of Two Methods of Teaching Fifth-Grade Spelling" (unpublished Doctoral dissertation, University of Florida, 1963).

textbook but each group studied a certain number of words from their written work and class activities depending on their achievement group. On the bases of the four tests: teacher made, standardized written work and attitude scales her conclusions were:

- 1) On the bases of the teacher-made and the written test, the results favored the experimental group.
- 2) Results on the standardized test favored neither.
- 3) A better liking and less dislike is fostered by the traditional method.

This study shows that one can completely disregard the formal lists, group children and still maintain adequate growth in spelling achievement. Although inferences from a single teacher's experiment must be limited, on the basis of twenty-four children she claims that there was a favorable change in attitude on the part of the slow children.

Nixon⁵¹ conducted a comparative study of the individualized and group methods of teaching spelling with seventy matched pairs of grade four students. The experimental group learned spelling by the individualized method. Each student kept a personal list of the spelling errors from the

⁵¹ Kenneth G. Nixon, "A Comparative Study of Individualized and Group Methods of Teaching Spelling," (unpublished Master's thesis, University of Alberta, 1965).

basic list and daily assignments and attacked these on an individual basis under the guidance of the teacher. The control group carried on in the traditional manner, a common list for all pupils.

The findings of this study showed no significant differences in paragraph spelling and repeated list test but results of the unfamiliar spelling favored the experimental group. In comparing boys and girls, only the spelling list test favored the girls.

The following implication made by Nixon seems relevant:

Whether children are organized homogeneously or heterogeneously in classes, it would appear that further subdivision of the class is necessary to meet the widespread needs of the individuals.⁵²

Burkhart's⁵³ study on the effectiveness of two teaching methods and two testing procedures on spelling achievement points to the need for grouping. His findings indicate that pupils spell fifty per cent of the words correctly before study of them begins.

⁵² Nixon, op. cit., p. 53.

⁵³ T.A. Burkhart, "The Effectiveness of Two Teaching Methods and Two Testing Procedures on Spelling Achievement," Dissertation Abstracts. Ann Arbor: University Microfilms, XXIV (November, 1963).

Delacato⁵⁴ compared a traditional method to an experimental method but the experimental group spent only one half the time on spelling and used words taken from their experiences. Although the scope of the experiment was very limited, he did find that the better readers showed more growth in spelling through the experimental method than did the poor readers.

Calhoun⁵⁵ conducted a two-month study on an intensive method of teaching spelling and a seven-month typical program. As one aspect of his intensive method he divided his class into two groups, the upper group, getting enrichment exercises, and the lower group studying fewer and less difficult words. He concluded that the intensive method of study produced much greater growth. Some serious limitations were: the limited duration of the intensive program, the small sample of only nineteen students and the fact that he did the teaching himself.

Sharpe experimented with three approaches of teaching spelling using 460 children at four elementary grade levels.

⁵⁴ C.H. Delacato, "Comparison of Two Methods of Teaching Spelling," Elementary English, XXIX (January, 1952), pp. 26-30.

⁵⁵ R.T. Calhoun, "A Comparison of a Typical and an Intensive Method of Teaching Spelling," Elementary School Journal, LV (November, 1954), pp. 154-157.

The experimental group placed emphasis on the individual approach whereas the other two approaches concentrated on the workbook activities. Although she reports no statistical differences she concludes: "The method of instruction should include load levels to meet individual differences...rather than identical methods for the entire class."⁵⁶

Flower, the editor of a series of texts in spelling, has this to say about grouping:

The most effective plan for meeting individual differences would appear to be some combination of grouping for spelling on the one hand and personal help or challenge to individual pupils on the other.⁵⁷

Hildreth⁵⁸ claims one of the limitations of the list spelling is that there is no provision for individual differences and, therefore, there ought to be grouping according to achievement but she offers no specific plan for an entire class.

Fitzgerald⁵⁹ indicated certain procedures which could take place in grouping but he did not propose any plan for

⁵⁶ Maida Wood Sharpe, "A Comparison of Three Approaches to Teaching Spelling," Elementary English, XXXVII (May, 1960), p. 320.

⁵⁷ George E. Flower, The MacMillan Spelling Series, Teachers' Edition (Toronto: The MacMillan Company of Canada, 1961), p. XIX.

⁵⁸ Hildreth, loc. cit.

⁵⁹ Fitzgerald, op. cit., p. 88.

regular instruction.

Regarding individual differences, Horn states:

In general, one-fourth of the children in any grade where spelling is taught do as well as the average child in the grade above and one-fourth no better than the average child in the grade below.⁶⁰

Along the same vein he adds: "It is inefficient to take the time of the whole class to meet the needs of only a few."⁶¹

Hatchet and Hughes summarized the thinking of many language arts authorities with this statement:

Grouping has been accepted as commonplace in reading instruction. It is not used as much as it should be in teaching spelling. Yet it is as logical to group children for learning to spell as it is for learning to read because spelling abilities are so clearly distinguishable.⁶²

Enrichment. Most authorities in the language arts see a definite need for enriching the spelling program for the above-average or superior spellers.

In his study of good spellers, Russell deduces:

⁶⁰ Ernest Horn, Teaching Spelling (Washington: Department of Classroom Teachers, American Research Association, National Education Association, 1954), p. 24.

⁶¹ Ibid., p. 25.

⁶² Ethel L. Hatchett and Donald H. Hughes, Teaching Language Arts in Elementary Schools (New York: The Ronald Press, 1956), p. 263.

...The usual spelling test ... should be supplemented by locally prepared lists and planned instruction in spelling related to other curricular activities and to writing needs.⁶³

Schoephoerster found the top spellers spelling over ninety-seven per cent of the words correctly prior to presentation. He maintained that this group learned so few additional words that, "a supplementary list of words ... could be prepared and taught concurrently."⁶⁴

Dawson, Zollinger and Elwell claim:

Probably the greatest waste in spelling instruction comes from having the able spellers in the class study and practice words they already know... The teacher should augment the weekly word lists.⁶⁵

Horn⁶⁶ believes that children who spell most of the words correctly on the pre-test should be excused from the regular spelling class once they learned all the words for the term.

Kyte suggests a similar approach:

⁶³ Russell, op. cit., p. 132.

⁶⁴ Schoephoerster, loc. cit.

⁶⁵ Mildred A. Dawson, Marian Zollinger and Ardelle Elwell, Guiding Language Learning (New York: Harcourt Brace and World Inc., 1963), p. 342.

⁶⁶ Ernest Horn, "Spelling," Encyclopedia of Educational Research (New York: MacMillan Company, 1960), p. 1346.

Some elementary school pupils with very high accomplishments in spelling may be excused from instruction in the subject with assurance that they will continue to improve in their spelling skill.⁶⁷

For the high achiever in spelling, Greene and Petty,⁶⁸ and Anderson⁶⁹ suggest word study related to synonyms and antonyms, varied meanings, roots, origins, history, derivatives, and the keeping of a personal list for words of special interest.

Remedial spelling. Most authorities in the language arts would agree to the need for remedial spelling, however, research is scarce.

In reviewing the characteristics of poor spellers Russell concludes:

The evidence is clear that the poor speller seldom develops an efficient attack on new words: ... school spelling programs should place ... more emphasis on ... developing techniques for the mastery of new words.⁷⁰

⁶⁷ George C. Kyte, "When Spelling Has Been Mastered in the Elementary School," Journal of Educational Research, XLII (September, 1948), p. 53.

⁶⁸ H.A. Greene and Walter T. Petty, Developing Language Skills (Boston: Allyn and Bacon Inc., 1963), p. 285.

⁶⁹ Paul S. Anderson, Language Skills in Elementary Education (New York: The MacMillan Company, 1964), pp. 152-199.

⁷⁰ D.H. Russell, Characteristics of Good and Poor Spellers (New York: Columbia University, 1937), p. 89.

Horn writes:

It is important to discover, as early as possible, pupils who are doing poor work in spelling ... These disabilities must be removed, or at least diminished, if the pupil is not to be handicapped in learning to spell.⁷¹

Fernald, a well known authority in remedial reading and spelling claims: "Poor spelling is the result of bad habits due ... to faulty techniques ... To remedy one must substitute good habits."⁷²

Williams stresses the need for every teacher to find some way of dealing with the majority of bad spellers as a group because usual methods do not work and pupils tend to develop "emotional blocks." Furthermore, he states:

The method for studying these special words should emphasize the coordination of the visual, auditory, and kinesthetic. The commonest criticism of conventional methods of teaching spelling is that they tend to concentrate on only one of these approaches.⁷³

Schonell is of the same opinion:

All channels of ingress should be employed in learning. It is by combination of visual, auditory, articulatory (involving accurate pronunciation) and graphomotor

⁷¹ Ernest Horn, Teaching Spelling (Washington: Department of Classroom Teachers, American Research Association, National Educational Association, 1954), p. 28.

⁷² Fernald, op. cit., p. 181.

⁷³ R.M. Williams, "Methods of Teaching Spelling to a Group of Seriously Retarded Students," College English, XVI (May, 1958), p. 504.

impressions that the spelling of words is firmly fixed in the memory.⁷⁴

Regarding the selection of words for the remedial group Fitzgerald says: "In planning the curriculum for the slow learners, a minimum core of the most useful words must be provided."⁷⁵

Dawson emphasizes that, "slow learners may need fewer words and be held for learning ... the most common."⁷⁶

Petty and Plessas argue:

All persons can learn to spell at least the minimum number of words they will need in their writing... Not all children will be able to learn an equal number of words. Persons of low intelligence...can learn to spell the words they need most.⁷⁷

Artley agrees:

Some children's growth potential is such that they will be able to learn to spell correctly only half, or even a third, of the number of words ordinarily assigned to a particular grade...⁷⁸

⁷⁴ Fred J. Schonell, Essentials in Teaching and Testing Spelling (London: MacMillan and Company, 1958), p. 18.

⁷⁵ Fitzgerald, op. cit., p. 8.

⁷⁶ Mildred Dawson, Teaching Language in the Grades (New York: World Book Company, 1951), p. 239.

⁷⁷ W.T. Petty and G.P. Plessas, Education, LXXXII (October, 1961), p. 81.

⁷⁸ A.S. Artley, "Principles Applying to the Improvement of Spelling Ability," Elementary School Journal, XLIX (November, 1948), p. 138.

In his review of research, Flower suggests:

Rather than frustrate some pupils with all 2000 words (basic list), it would be more realistic to ask them to concentrate on an even smaller number of the most-frequently-used words.⁷⁹

V. SUMMARY

From a purely psychological point of view there seems to be a need to group and differentiate for instruction in spelling to accommodate the varied capacities of students. Word lists contain too many words for uniform assignment to ungrouped classes because there is little agreement as to the criteria for selection and placement. There seems to be no agreement as to the best general method of teaching spelling. Rules are valuable if inductively learned and cover a large number of cases. The pre-test is a valuable teaching device. Grouping in itself without differentiating instruction has little relationship to spelling achievement. There is need for remedial instruction in spelling. There is also need for enrichment to challenge the superior spellers and most studies show that top students can engage in other activities during spelling instruction and still maintain a good

⁷⁹ G.E. Flower, "Research in Spelling, A Review," Canadian Research Digest (Toronto: The Canadian Education Association, No. 3) (Summer, 1959), p. 108.

level of achievement. However, attempts to group in spelling as in reading have not found fertile ground. Even though authorities like Hildreth, Fitzgerald, O'Leary and Horn have agreed on the desirability of grouping in spelling, the typical spelling situation continues to be that patterned after the basic speller with the uniform list studied by the ungrouped classes.

CHAPTER III

RESEARCH DESIGN

This chapter describes the research design employed to test the hypotheses regarding grouping for differentiated instruction in spelling. Information is given concerning the selection of the pupil sample and teacher sample involved in this study. A description of the testing instruments and how these tests were administered is presented. The method for differentiating instruction to the various groups is explained. Finally, the chapter concludes with an explanation of how the data from this experiment was treated.

I. SELECTION OF SAMPLE

Pupil Sample. In an effort to sample similar populations, from a point of view of socio-economic status, the experimental and control schools were chosen from the same neighborhood. The schools were adjacent to each other and in a recently developed area of west-end Edmonton. Each school had a total enrollment (excluding grade one) of about four hundred fifty.

Since this study was also considered valuable as an in-service program, all the classrooms from Grade Two to

Grade Six inclusive, were used. Furthermore, in using the total school population there was a better possibility of being assured of a heterogeneous distribution of pupils. Another reason for choosing all grades involved in the elementary spelling program was so that the relative effects of grouping for differentiated instruction and the traditional approach among the various grades and groups might be investigated.

TABLE I

DISTRIBUTION OF PUPILS ACCORDING TO GRADE IN EACH SCHOOL AT BEGINNING AND END OF EXPERIMENT

GRADE	Experimental		Control		Total	
	Beginning	End	Beginning	End	Beginning	End
II	101	95	73	70	174	165
III	81	78	103	98	184	176
IV	80	78	85	81	165	159
V	88	87	71	69	159	156
VI	76	74	79	78	155	152
	426	412	411	396	837	808*

*Twenty-nine students transferred during the study.

Teacher sample. A total of thirty-one teachers were involved in the study, sixteen in the experimental school and fifteen in the control school. The average number of years of

training for the experimental teachers and the control teachers was two and a half years, and two and eight tenth years respectively. However, in average years of teaching experience the experimental teachers had ten years experience as compared with seven years for the control school. The experimental teachers then had slightly less training but more experience than the control teachers. The teachers of the two schools were fairly evenly matched when training and experience are taken as a combined criterion.

The average number of years of training for the teachers of both schools was about two and three-quarter years and the average teaching experience was eight and a half years.

II. TESTING INSTRUMENTS

The Edmonton Spelling Ability Test II and Test IV were used in this experiment. There is no documented evidence as to the validity and reliability of these tests. However, information on how these tests were constructed and normalized is available.

Test II was constructed in 1946 and normalized in 1947 on a city wide population (9000). The words were selected from the Ayres, Buckingham and Thorndike lists. The Ayres list (based on four previous studies) consists of the 1000

commonest words presented in a scale in groups of approximately equal spelling difficulty. The scale is so arranged as to indicate about what percentage of children in the various grades in eighty-four cities throughout the country succeeded in spelling the words correctly. Buckingham extended Ayres list with 500 words selected according to agreement from the spelling texts. Thorndike made a list of the 10,000 most frequently occurring words based on forty-three different sources. He also listed the 2500 words most widely and frequently used, arranged in sets of 500 each.

In 1948 Test II was revised and normalized on a randomly selected population. In 1951 Test IV was constructed and normalized on another randomly selected population from grade two to grade nine inclusive.

Although the test may be somewhat outdated, particularly at the higher grade levels, the author is convinced that it is still a reasonably accurate measuring device. The authors of the test have used well recognized lists as sources for words and prepared the tests according to recognized principles of test construction. Finally, the tests have been standardized on a large population.

III. PROCEDURE

Testing program. The Edmonton Spelling Ability Test II was administered as a pre-test just prior to the experiment on January 18, 1966 to all students present in both schools. Because of the large number of classrooms involved each teacher administered the test to his or her own class according to the uniform instructions provided. All the test papers were collected immediately and scored by the author. The test booklets were collected and the teachers were cautioned against using any of the Edmonton Spelling Ability Tests during the period of the study.

Fourteen weeks later on April 29, 1966 the Edmonton Spelling Ability Test IV was administered as a post-test to the experimental and control schools immediately following the use of the prescribed curricula. Using the same set of directions, each teacher gave the post-test under conditions as similar as possible as those under which the pre-test was administered. Again, the test papers were collected immediately and scored by the author.

TEACHING PROCEDURE FOR THE EXPERIMENTAL SCHOOL

Grouping procedure. The pupils were then grouped on the basis of their pre-test scores according to the following modified norms from the Spelling Manual. (See Appendix A)

Grade Six

Group A - students whose scores were grade 8.5 and above.
Group B - students whose scores were from grade 5.5 to 8.4.
Group C - students whose scores were grade 5.4 and below.

Grade Five

Group A - students whose scores were grade 7.5 and above.
Group B - students whose scores were grade 4.5 to 7.4.
Group C - students whose scores were grade 4.4 and below.

Grade Four

Group A - students whose scores were grade 5.8 and above.
Group B - students whose scores were from grade 4.1 to 5.7.
Group C - students whose scores were grade 4.0 and below.

Grade Three

Group A - students whose scores were grade 5.0 and above.
Group B - students whose scores were from grade 3.0 to 4.9.
Group C - students whose scores were grade 2.9 and below.

Grade Two

Group A - students whose scores were grade 3.5 and above.
Group B - students whose scores were grade 2.5 to 3.4.
Group C - students whose scores were grade 2.4 and below.

Program for Group A. All students in this group were held responsible for the regular list in the spelling text plus enrichment activities. Enrichment varied in degree from grade to grade, for instance, the grade two students in this group concentrated on curriculum and special interest words, whereas, the grade six group concentrated on most of the following:

TABLE II
DISTRIBUTION OF PUPILS ACCORDING TO
GROUP (A, B AND C) IN EACH SCHOOL

GRADE	Experimental				Control				Both Schools			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
II	20	53	22	95	18	39	13	70	38	92	35	165
III	11	49	18	78	36	54	8	98	47	103	26	176
IV	21	46	11	78	35	29	17	81	56	75	28	159
V	20	52	15	87	12	52	5	69	32	104	20	156
VI	19	43	12	74	30	40	8	78	49	83	20	152
Total	91	243	78	412	131	214	51	396	222	457	129	808

1. Curriculum words, e.g., science, social studies, mathematics, reading and health.
2. Derivatives.
3. Foreign roots, e.g., Latin, Greek, French.
4. Word meanings in depth.
5. Synonyms and antonyms.
6. History of words.
7. Compound words.
8. Words of special interest (individual).
9. Using new words in creative writing.

Although there was no limit on the number and variety of extra words each child studied, there was an arbitrarily set minimum number for which each student at a particular

grade level was held responsible:

Grade Six - fifteen words.

Grade Five - twelve words.

Grade Four - ten words.

Grade Three - seven words.

Grade Two - five words.

All teachers, depending on grade level being taught, received some of the following resource materials:

1. Twelve specifically prepared lessons of suggested words and activities.
2. Mimeographed lists of foreign roots.
3. Mimeographed lists of common prefixes, suffixes, and their meanings.
4. Large and small dictionaries.
5. Resource books on word origins. (For details see Appendix C)

Program for Group B. This group followed the regular lists and exercises as outlined in the Basic Goals in Spelling and the MacMillan Spelling Series which are the authorized spellers in Alberta now. Each weekly lesson in the Basic Goals in Spelling lists the words and suggests activities such as: pronounce the words, do the written exercises, take a trial test, study again, and take the final test. The plan in the MacMillan Spelling Series includes the following weekly activities: introducing the new words,

teaching the new words through the activities and exercises, testing and checking, re-teaching and practice, and re-testing and re-checking. The students in this group were not permitted to do any of the enrichment activities suggested in the spellers.

Program for Group C. This group studied only two-thirds of the words in each lesson as listed in Basic Goals in Spelling. These words were pre-selected by the teachers (and recorded) on the bases of phonetic consistency and usefulness. These students were also given some of the regular written exercises as provided in the regular weekly lesson. However, the emphasis for instruction was on the modified Fernald technique as outlined below:

- 1) The teacher writes the word on the chalkboard and says it while writing.
- 2) The pupil is asked to say the word with the teacher while looking at it. (Later on the pupil may be asked to look at the word in the text using the paper towel as a marker).
- 3) The pupil looks at the word, says it slowly and writes it with his finger on the paper towel.
- 4) Repeat step three, look, say, and trace slowly.
- 5) The pupil is asked to "close your eyes when you think you have got it" and say the word slowly as you trace it on the paper towel.
- 6) The pupil is asked to "open your eyes and check. If you did not get it, repeat the steps."

- 7) The above procedure is tried with two or three words (at grade two and three level) or five or six words (at the grade four, five and six level).
- 8) The teacher now dictates the above words. The pupils are instructed to listen carefully because the word will be said only once. The next word follows immediately.
- 9) The pupil is asked to record the difficult words and study them.

The teachers were advised to permit students to eliminate some of the above steps once they had acquired a proficient method of learning new words.

In-service program. Two preliminary meetings were held with the author and each of the principals of the experimental and control school. Three general staff meetings were held with the experimental school. In order to counter the "Hawthorne effect" in the experimental school, the same number of general meetings were held with the control school except that the agenda consisted of general ways of improving spelling instruction rather than specific procedures related to grouping as in the experimental school.

The first general meeting, which lasted for about twenty minutes, took place on January 17, 1966 and centered on the nature of the project and instructions concerning the testing program.

The second meeting, again lasted about twenty minutes

and took place on January 24, 1966. For the experimental school the presentation centered on the nature of the test results, the grouping plan, and how to implement the plan for differentiated instruction. Following this, there were brief grade meetings (with the teachers of each grade and the author) which dealt with the implementation of the plan at the particular grade level. Each teacher was also given printed instructions regarding the nature of the project, the activities for each group and the modified Fernald technique. (see Appendix A)

For the control school this meeting centered on such topics as causes of poor spelling, relative merits of the pre-test and post-test, various ways of presenting new words, and discussion of research on time allotments in the spelling program for the various grade levels.

The third general meeting lasted for about a half hour and took place on February 10, 1966. The agenda for both schools consisted of a film by William Kottmeyer entitled "Basic Goals in Spelling" followed by a discussion. The emphasis in this film was on the value of teaching spelling through the use of phonetic and structural principles.

Finally, for the experimental school, a five-minute demonstration lesson was given by the author to each teacher who requested it. This lesson demonstrated the use of the

modified Fernald technique as used with Group C.

Teaching procedure for the control school. The control school followed the plan as outlined in Basic Goals in Spelling and The MacMillan Spelling Series. All the students of the same grade in each classroom studied the uniform list of words for the week. The weekly plan in Basic Goals in Spelling is to pronounce the words, perform the written exercises, take a trial test, study again, and take the final test. The plan in The MacMillan Spelling Series includes the following weekly activities: introducing the new words, teaching the new words through the activities and exercises, testing and checking, re-teaching and practice, and re-testing and re-checking. There was no grouping for instruction as defined in this study.

In addition to the in-service program described in the previous section, the teachers in the control school were encouraged to use any additional teaching techniques that might be useful in a regular classroom situation. The control school also had the services of a half-time remedial teacher who worked with the classroom teachers indirectly to help students in special need. This may have further helped to counter the "Hawthorne effect" in the experimental school.

TREATMENT OF DATA

Using the program PERSUB, designed for the IBM 7040 computer, a one-way analysis of covariance was used to investigate the relationship between the predictor variables (treatment groups) and the criterion variable (post-test) using a covariate control (pre-test). The one-way analysis of covariance, as used here, is based on the technique of multiple linear regression which assumes that between a set of predictors and a criterion there exists a linear relationship of the form:^{1,2}

$$Y = A_1 X_1 + A_2 X_2 + \dots A_n X_n + A_{n+1} + e$$

where A_i are weights to be found. In use, the set A_i ($i=1, n$) is selected so as to minimize the error sum of squares (ESS) between the thus predicted criterion, \hat{Y}_1 , and the measured values of Y . A_{n+1} is a constant.

Thus we get:

$$(\text{Model 1}) \quad \hat{Y}_1 = A_1 X_1 + A_2 X_2 + \dots A_n X_n + A_{n+1}$$

The error sum of squares is calculated over the number of individuals (N).

¹ J.W.G. Ivany, "A Comparison of Expository and Hypothetical Modes of Teaching Science," (unpublished Doctor's thesis, University of Alberta, 1965), pp. 58-60.

² Joe H. Ward, "Multiple Linear Regression Models," Computer Applications in the Behavioral Sciences, Harold Borko (ed.) (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), pp. 207-212.

In minimizing the error the correctness of prediction is maximized. The measure to be used to reflect the maximized correctness of prediction is the squared multiple correlation (R^2). This correlation represents the proportion of the variance of the criterion accounted for by the equation predicting \hat{Y}_1 , and called Model 1.

To determine the influence of a particular variable, say X_2 , a new model, Model 2, is written such that:³

$$\hat{Y}_2 = A_1 X_1 + A_3 X_3 + A_4 X_4 + \dots A_n X_n + A_{n+1}$$

\hat{Y}_1 equation or Model 1 uses all the possible prediction information and is referred to as the full or unrestricted model, whereas, since \hat{Y}_2 equation or Model 2 restricts variable X_2 it is referred to as the restricted model. Model 2 leads to a squared multiple correlation $(R_2)^2$ which will be less than or equal to $(R_1)^2$. Any predictor variable can be studied in this way.

The F ratio is used to test the significance of the contribution of any one variable X_i in the presence of the others. The degrees of freedom (df_j) are determined by the

³ Robert A. Bottenberg and Joe H. Ward, Jr., Applied Multiple Linear Regression, Clearinghouse for Scientific and Technical Information. U.S. Department of Commerce, Technical Documentary Report PRL-TDR-63-6 (Washington: Government Printing Office, 1963), pp. 88-94.

number of variables in the model. The F ratio is defined as:

$$F = \frac{(R_1^2 - R_2^2)/df_1}{1 - R_1^2/df_2} \quad \text{where}$$

F is the value used to determine whether a statistically significant result has occurred.

R_1^2 is the squared multiple correlation, the "goodness" of prediction for Model 1.

R_2^2 is the "goodness" of prediction for Model 2.

df_1 are degrees of freedom for the numerator.

df_2 are the degrees of freedom for the denominator.⁴

To check the eight hypotheses a total of fifty-six models were used in this study. The covariate control in each of the models was the Edmonton Spelling Ability Test II, pre-test (x_1). The criterion variable was the Edmonton Spelling Ability Test IV, post-test (x_2). To test whether any significant differences occurred between the various models, the following data, given in the computer output, were used:

- 1) the mean for each variable
- 2) the coefficients for each variable
- 3) the squared multiple correlation

⁴ Steve Hunka, "How to Build Your Own Models for Statistical Analysis," (mimeographed Student Notes, Part I, Elementary Education, University of Alberta, 1965), p. 15.

- 4) the F ratio
- 5) the probability level.

Finally, in making comparisons between grades and groups in each school where more than two means were involved, following an F test that had shown significance, the Newman-Keuls procedure was used to find out which means differ significantly from which others.⁵

⁵ E.S. Keeping, Introduction to Statistical Inference (Toronto: D. VanNostrand Co. Inc., 1962), pp. 242-245.

CHAPTER IV

ANALYSIS OF DATA AND SUMMARY OF FINDINGS

This chapter is organized into nine sections. The first section compares spelling achievement of the total experimental population with that of the control population. The second section compares spelling achievement between the two schools at each grade level. The third section compares spelling achievement among the grades in the experimental school and section four compares spelling achievement among the grades in the control school. Section five compares spelling achievement between the experimental and control school at each group level (A, B and C) and section six compares spelling achievement between schools at the group level in each grade. Section seven is a comparison of spelling achievement among groups in the experimental school and section eight is a comparison of spelling achievement among groups in the control school. The chapter concludes with a summary of findings.

I. COMPARISON OF THE EXPERIMENTAL AND CONTROL SCHOOL

A total of 808 individuals in the experimental and control schools were given the pre-test (Edmonton Spelling

Ability Test II) and the post-test (Test IV) on January 18, 1966 and April 29, 1966, respectively. Using a one-way analysis of covariance based on the models as explained under Treatment of Data in Chapter III, the following models were used to test for the significance of the difference in spelling achievement between the two schools.

Model 1 (Full): $x_2 = a_1 x_1 + a_3 x_3 + a_4 x_4 + \text{error}$

Model 2 (Restricted): $x_2 = a_1 x_1 + \text{error}$

where a_1 , a_3 , a_4 are weights to be found

x_1 is the covariate control (pre-test)

x_2 is the criterion variable (post-test)

x_3 is a predictor variable (experimental school)

x_4 is a predictor variable (control school)

Table III, a summary of the findings, indicates there was no significant difference in spelling achievement between the two schools selected for this study. Although the adjusted mean score favored the experimental school, the difference was very small. Therefore, the results of the treatment for the two schools were not different. For comparison of total pre-test with total post-test see Appendix B.

TABLE III
SIGNIFICANCE OF DIFFERENCE BETWEEN THE TWO SCHOOLS

Models	N		Variables			Adjusted Means		R^2		df	F	Prob.	Find- ing	
	E	C	Tot.	Crit.	Cov.	Pred.	E	C	R^2_1	R^2_2				
1:2	412	396	808	X_2	X_1	X_3, X_4	28.02	27.94	0.9068	0.9067	1/807	0.1264	0.7246	n.s.

II. COMPARISON OF THE EXPERIMENTAL AND CONTROL
SCHOOL AT EACH GRADE LEVEL

Table IV is a summary of findings comparing the two schools at each grade level. The same models as above were used to make the comparisons based on the post-test as the criterion variable (X_2), the pre-test as a covariate (X_1), and the schools as predictors (X_3, X_4). There were no significant differences in spelling achievement between the two schools at each grade level. However, the pattern, as shown in Figure 1 seems to show that the adjusted mean score at the Grade Two and Grade Three level seemed to favor the experimental school, whereas at the other grade levels it was in favor of the control school.

III. COMPARISONS AMONG GRADES IN THE EXPERIMENTAL SCHOOL

Table V is a summary of findings for differences among the grades in the experimental school when the following models were compared:

Model 13:

$$X_2 = A_1 X_1 + A_{23} X_{23} + A_{24} X_{24} + A_{25} X_{25} + A_{26} X_{26} + A_{27} A_{27} + \text{error}$$

Where X_{23} is Grade Two

X_{24} is Grade Three

X_{25} is Grade Four

TABLE IV
SIGNIFICANCE OF DIFFERENCES BETWEEN SCHOOLS AT EACH GRADE LEVEL

Gr.	Models	N	Variables				Adjusted Means Σ	R^2 R^2_1	df	F	Prob.	Find- ing			
			C	Tot.	Crit.	Cov.	Pred.								
II	3:4	95	70	165	X_2	X_1	X_3, X_4	16.24	16.00	0.7204	0.7198	1/163	0.3701	0.5438	n.s.
III	5:6	78	98	176	X_2	X_1	X_3, X_4	23.95	23.72	0.8136	0.8134	1/174	0.1972	0.6576	n.s.
IV	7:8	78	81	159	X_2	X_1	X_3, X_4	28.59	28.61	0.8035	0.8035	1/157	0.0015	0.9691	n.s.
V	9:10	87	69	156	X_2	X_1	X_3, X_4	33.88	34.28	0.8227	0.8221	1/154	0.5347	0.4658	n.s.
VI	11:12	74	78	152	X_2	X_1	X_3, X_4	34.41	34.55	0.7668	0.7667	1/150	0.0720	0.7887	n.s.

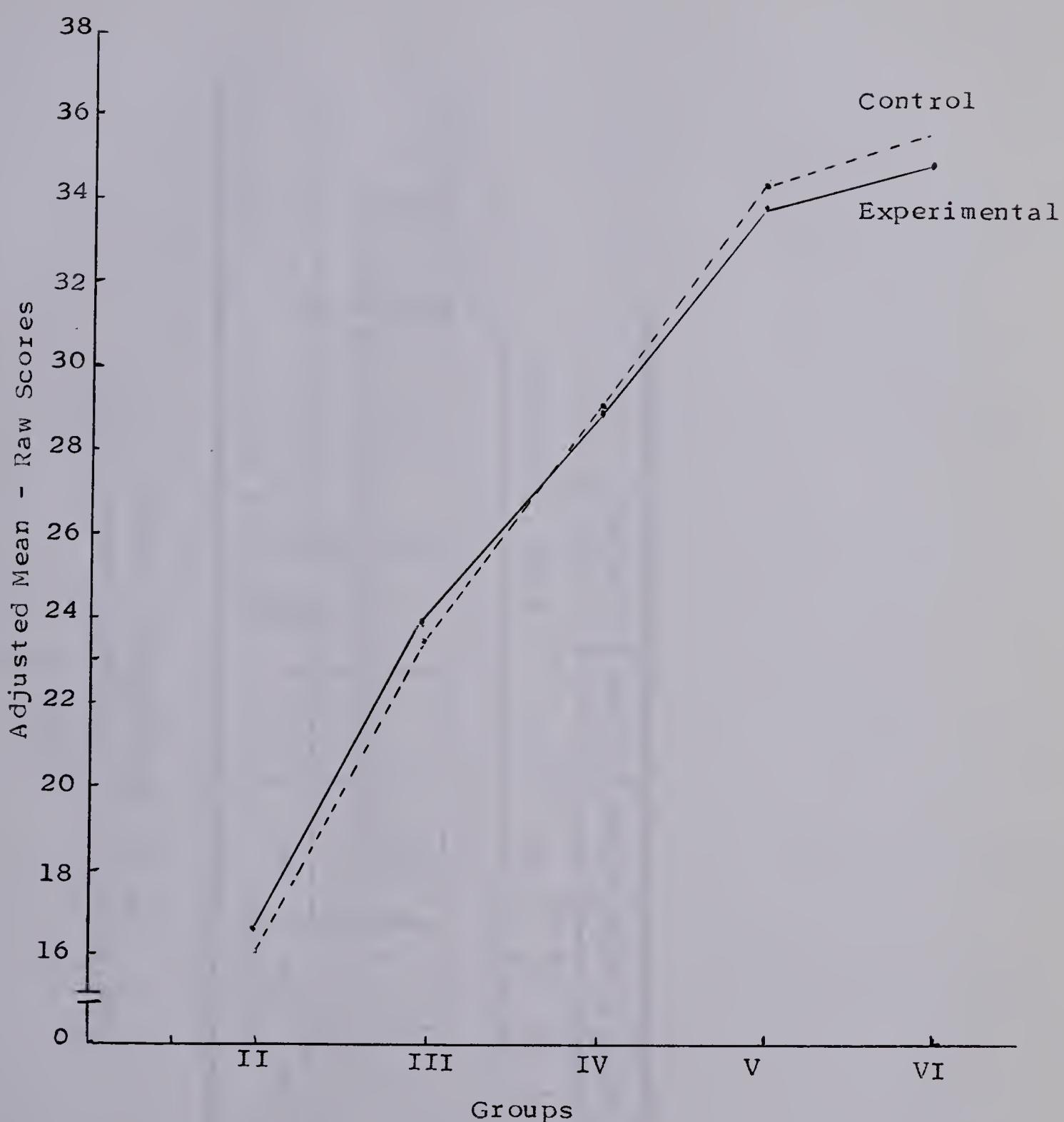


FIGURE 1

COMPARISON OF THE EXPERIMENTAL AND CONTROL
SCHOOL AT EACH GRADE LEVEL

TABLE Va

SIGNIFICANCE OF DIFFERENCES AMONG GRADES
IN THE EXPERIMENTAL SCHOOL

Models	N	Crit.	Variables			Adjusted Means		
			Cov.	Pred.	II	III	IV	V
13:14	412	X_2	X_1	X_{23} , X_{27}	27.30	26.83	26.05	27.27
								28.70

R_1^2	R_2^2	df	F	Prob.	Finding
0.9065	0.9008	4/407	6.1454	0.0008	S

x_{26} is Grade Five

x_{27} is Grade Six

and Model 14: $x_2 = A_1 x_1 + \text{error}$

There was found to be a significant difference among the five grades in the experimental school. Based on a common regression line and having used the pre-test as a covariate control the differences in the adjusted means among grades showed the relative gains. The rank order of treatment means was Grade Four, Grade Three, Grade Five, Grade Two, and Grade Six. Using the Newman-Keuls procedure (see Table Vb) and based at the one per cent level, it was found that treatment means for Grade Three, Grade Five, and Grade Two were not significantly different. The treatment mean for Grade Four was the smallest and significantly different from all the others, whereas the treatment mean for Grade Six was the largest and significantly different from all the others. The Grade Four group produced the least gain while the Grade Six group produced the most and the difference between these extremes was 2.65.

IV. COMPARISONS AMONG GRADES IN THE CONTROL SCHOOL

Table VIa is a summary of findings for differences among the grades in the control school when the following models were compared:

TABLE Vb

TESTS ON ALL ORDERED PAIRS OF MEANS
(Newman-Keuls procedure)¹

(i)	Rank Order	1	2	3	4	5
	Treatments in order of T_j (<u>Grades</u>)	IV	III	V	II	VI
	T_j	26.05	26.83	27.27	27.30	28.70

(ii)	IV	III	V	II	VI
	IV	--	0.78*	1.22*	1.25*
	III	--	0.44	0.47	1.87*
	V	--	0.03	1.43*	
	II	--	--	1.40*	
	VI	--	--	--	

*Significant at one per cent level

(iii)	Truncated r	2	3	4	5
	q.99 (r, 407)	3.64	4.12	4.40	4.60
	q.99 (r, 407) $\cdot \sqrt{n \text{ MS}_{\text{error}}}$	0.47	0.53	0.56	0.59

¹ B.J. Winer, Statistical Principles in Experimental Design (Toronto: McGraw-Hill Book Company, Inc.), 1962, pp. 80-85.

TABLE VIa

SIGNIFICANCE OF DIFFERENCES AMONG GRADES
IN THE CONTROL SCHOOL

Models	N	Variables			Adjusted Means			
		Crit.	Cov.	Pred.	II	III	IV	V
15:16	396	X_2	X_1	X_{28} , X_{32}	29.51	28.89	27.82	29.20

R^2_1	R^2_2	df	F	Prob.	Finding
0.9170	0.9126	4/391	5.2096	0.00043	S

Model 15:

$$X_2 = A_1 X_1 + A_{28} X_{28} + A_{29} X_{29} + A_{30} X_{30} + A_{31} X_{31} + A_{32} X_{32} + \text{error}$$

Where X_{28} is Grade Two

X_{29} is Grade Three

X_{30} is Grade Four

X_{31} is Grade Five

X_{32} is Grade Six

and Model 16: $X_2 = A_1 X_1 + \text{error}$

A significant difference was found among the five grades in the control school. As in Section III, using the Newman-Keuls procedure (see Table VIb) and based at the one per cent level of significance it was found that the rank order of adjusted treatment means was identical to that for the experimental school, except that the difference between the smallest and largest was only 2.11 as contrasted with 2.65 for the experimental. The adjusted treatment mean for Grade Four was significantly different from all the others, the Grade Six adjusted treatment mean was significantly different from all the others, except Grade Two, and the adjusted treatment mean for Grade Three was also different from that for Grade Two. Except for the difference between the extremes, the pattern (see Figure 2) or rank order of grades according to adjusted treatment means is identical to that of the experimental school. This difference in gain favoring

TABLE VIIb

TESTS ON ALL ORDERED PAIRS OF MEANS
(Newman-Keuls procedure)

(i)	Rank Order	1	2	3	4	5
	Treatments in order of T_j (Grades)	IV	III	V	II	VI
	T_j	27.82	28.87	29.20	29.51	29.93

(ii)	IV	III	V	II	VI	
	IV	--	1.05*	1.38*	1.69*	2.11*
	III	--	0.33	0.64*	1.06*	
	V		--	0.31	0.73*	
	II			--	0.42	
	VI				--	

*Significant at one per cent level

(iii)	Truncated range r	2	3	4	5
	q.99 (r,391)	3.64	4.12	4.40	4.60
	q.99 (r,391) $\cdot \sqrt{n \text{ MS}_{\text{error}}}$	0.46	0.52	0.55	0.58

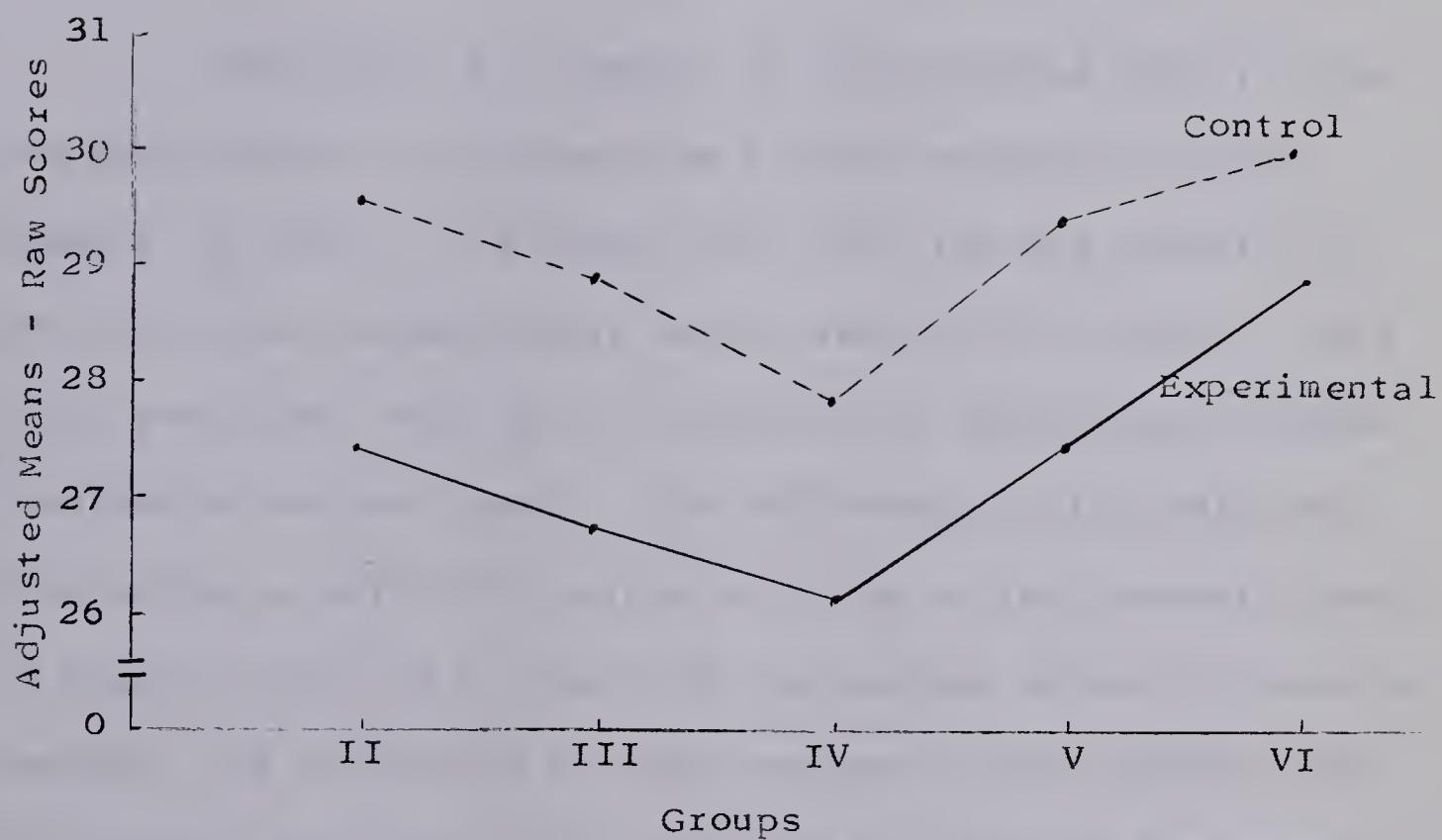


FIGURE 2
COMPARING SCHOOLS FOR DIFFERENCES
AMONG GRADES

the experimental school may be due to the difference in treatment.

V. COMPARISONS BETWEEN SCHOOLS FOR
EACH TOTAL GROUP (A, B and C)

Table VII is a summary of the findings used to show the significance of differences between schools for each group A, B and C. The models used test for the effects of the variables, experimental school and control school. This table indicates there are no significant differences between treatments for each group. The difference in the adjusted mean score is only 0.01 points in favor of the control school in Group B and 0.26 in favor of the control school in Group A. However, the difference in adjusted mean scores between the two schools for Group C is 0.99 points, favoring the experimental school at a 0.0892 level of probability. Group C of the experimental school, then, may have benefited more than Group C of the control school because of treatment. For comparative gains see Figure 3.

VI. COMPARISONS BETWEEN SCHOOLS FOR EACH
GROUP (A, B AND C) WITHIN EACH GRADE

Table VIII is a summary of the findings used to show the significance of differences between the two schools

TABLE VII
DIFFERENCES BETWEEN SCHOOLS FOR EACH GROUP (A, B AND C)

Models	N			Variables			Adjusted			Find- ing				
	E	C	Tot.	Crit.	Cov.	Pred.	E	C	R^2_1	R^2_2	df	F	Prob.	
17:18	91	131	222	X ₂	X ₁	A Exp. A Con.	35.62	35.88	0.9050	0.9048	1/220	0.4787	0.4893	n.s.
19:20	243	214	457	X ₂	X ₁	B Exp. B Con.	27.51	27.52	0.8606	0.8605	1/455	0.0231	0.8796	n.s.
21:22	78	51	129	X ₂	X ₁	C Exp. C Con.	17.62	16.61	0.7810	0.7760	1/127	2.9338	0.0892	n.s.

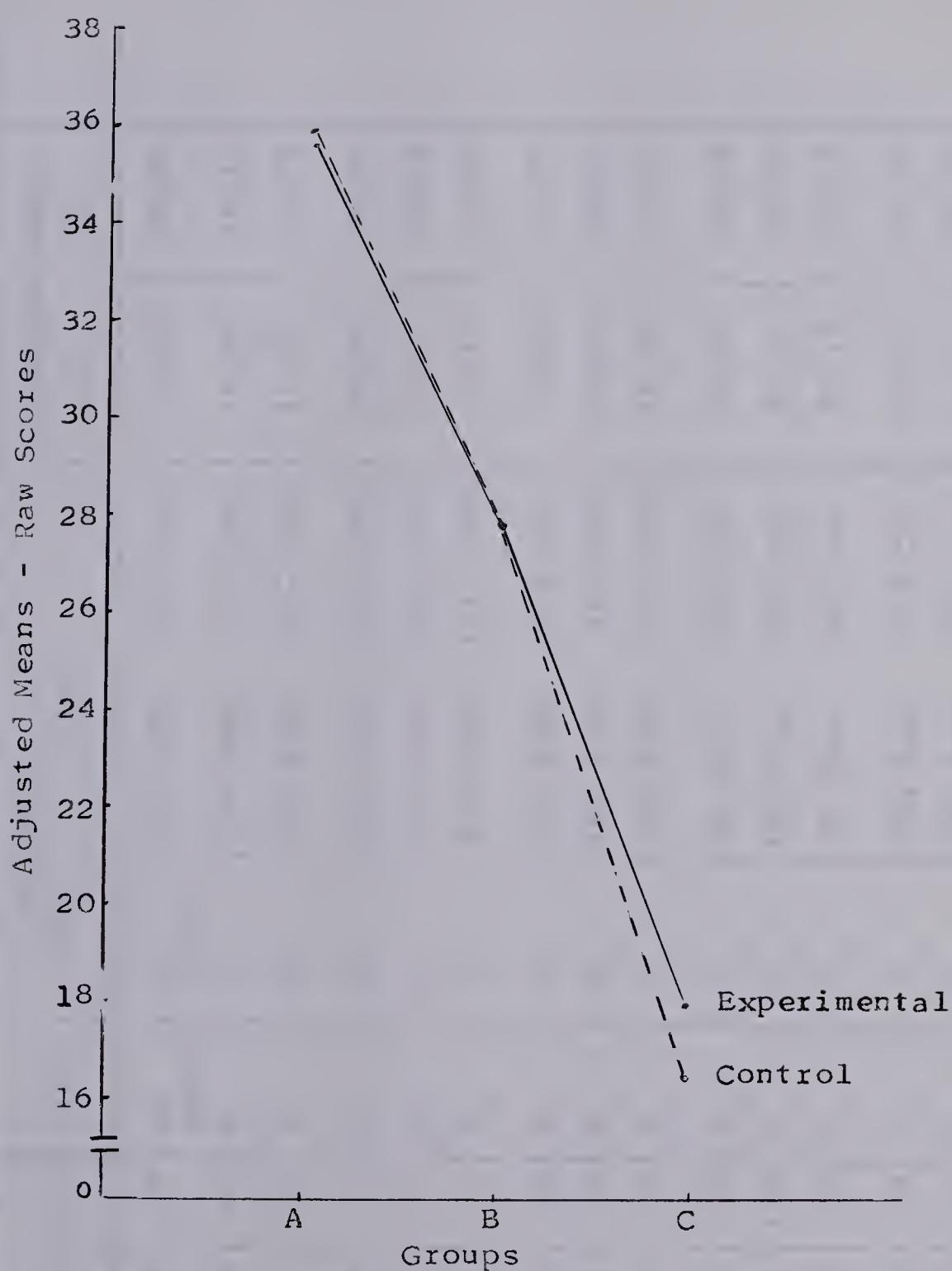


FIGURE 3
COMPARING SCHOOLS FOR EACH GROUP
(A, B and C)

TABLE VIII

SIGNIFICANCE OF DIFFERENCES BETWEEN SCHOOLS FOR GROUPS WITHIN GRADES

Models	N	E	C	Tot.	Crit.	Cov.	Variables			Adjusted Means		
							IIA	Exp.	IIA	Con.	E	C
23:24	20	18	38	X ₂	X ₁	X ₁	IIA	Exp.	IIA	Con.	21.34	20.96
25:26	53	39	92	X ₂	X ₁	X ₁	IIB	Exp.	IIB	Con.	16.38	16.15
27:28	22	13	35	X ₂	X ₁	X ₁	IIC	Exp.	IIC	Con.	10.01	10.01
29:30	11	36	47	X ₂	X ₁	X ₁	IIIA	Exp.	IIIA	Con.	34.82	32.26
31:32	49	54	1C2	X ₂	X ₁	X ₁	IIIB	Exp.	IIIB	Con.	21.84	22.24
33:34	18	8	26	X ₂	X ₁	X ₁	IIIC	Exp.	IIIC	Con.	15.18	13.63
35:36	21	35	56	X ₂	X ₁	X ₁	IVA	Exp.	IVA	Con.	35.92	35.77
37:38	46	29	75	X ₂	X ₁	X ₁	IVB	Exp.	IVB	Con.	26.79	26.63
39:40	11	17	28	X ₂	X ₁	X ₁	IVC	Exp.	IVC	Con.	19.37	18.92
41:42	20	12	32	X ₂	X ₁	X ₁	VA	Exp.	VA	Con.	42.40	43.29
43:44	52	52	104	X ₂	X ₁	X ₁	VB	Exp.	VB	Con.	33.45	33.85
45:46	15	5	20	X ₂	X ₁	X ₁	VC	Exp.	VC	Con.	20.16	19.11
47:48	19	30	49	X ₂	X ₁	X ₁	VIA	Exp.	VIA	Con.	44.15	45.82
49:50	43	40	83	X ₂	X ₁	X ₁	VIB	Exp.	VIB	Con.	38.97	38.70
51:52	12	3	20	X ₂	X ₁	X ₁	VIC	Exp.	VIC	Con.	28.98	26.18

TABLE VIII (continued)

Models	R^2_1	R^2_2	df	F	Prob.	Finding
23:24	0.5823	0.5764	1/36	0.5066	0.4812	n.s.
25:26	0.2052	0.2032	1/90	0.2286	0.6337	n.s.
27:28	0.1513	0.1513	1/33	0.0000	0.9982	n.s.
29:30	0.5109	0.4540	1/45	5.2406	0.0268	S (.05)
31:32	0.4829	0.4805	1/101	0.4699	0.4946	n.s.
33:34	0.2204	0.1854	1/24	1.0773	0.3097	n.s.
35:36	0.5113	0.5109	1/54	0.0421	0.8381	n.s.
37:38	0.2986	0.2983	1/73	0.0366	0.8489	n.s.
39:40	0.3992	0.3959	1/26	0.1415	0.7098	n.s.
41:42	0.2745	0.2468	1/30	1.1452	0.2931	n.s.
43:44	0.5928	0.5915	1/102	0.3194	0.5732	n.s.
45:46	0.1786	0.1553	1/18	0.5100	0.4843	n.s.
47:48	0.2168	0.1092	1/47	6.4559	0.0144	S (.05)
49:50	0.3972	0.3963	1/81	0.1162	0.7340	n.s.
51:52	0.5386	0.4666	1/18	2.8065	0.1117	n.s.

according to the group in each grade.

Table VIII indicates a significant difference at the five per cent level in only two instances, in Grade Three Group A and Grade Six Group A. In the former case, the adjusted treatment mean favored the experimental school, whereas, in the latter, the treatment favored the control school.

Although the differences are not significant at all the other levels, there are some interesting patterns. Group A in the experimental school seems to have done better up to and including Grade Four, but from there on the trend is reversed, the control school did better. Group B in each grade seems to have done about equally well in both schools. However, Group C in the experimental school seems to have done progressively better from the lower to the higher grades, except in Grade Two, where the adjusted treatment means were equal. For instance, Group C in Grade Six had an adjusted treatment mean which favored the experimental school at the 0.11 level of probability. Perhaps, the difference in means could be attributed to the treatment.

VII. COMPARISONS AMONG GROUPS (A, B AND C)
IN THE EXPERIMENTAL SCHOOL

Table IX is a summary of the analysis of covariance used to show the significance of differences among the three groups within the experimental school. The results show no significant differences in achievement among the three groups. However, it is of interest to note that Group C made the greatest mean gain, followed by Group B and then Group A.

VIII. COMPARISONS AMONG GROUPS (A, B AND C)
IN THE CONTROL SCHOOL

Table X is a summary of the analysis of covariance used to show the significance of differences among the three groups within the control school. The results show no significant differences in achievement among the three groups. However, it is of interest to note that Group B made the greatest mean gain followed by Group C and Group A with almost equal means.

IX. SUMMARY OF THE FINDINGS

A total of fifty-six restricted and unrestricted models were compared at the various levels of school, grade and group. Eight major comparisons were made and the findings

TABLE IX
SIGNIFICANCE OF DIFFERENCES AMONG THE GROUPS IN THE EXPERIMENTAL SCHOOL

Model	N	Crit.	Cov.	Pred.	Variables			Adjusted Means			R^2_1	R^2_2	df	F	Prob.	Find-ing
					A	B	C	A	B	C						
53:54	412				X ₁	Group A, B,C	27.00	27.19	27.44	0.9009	0.9009	0.9008	2/409	0.2469	0.7818	n.s.

TABLE X
SIGNIFICANCE OF DIFFERENCES AMONG THE GROUPS IN THE CONTROL SCHOOL

Model	N	Crit.	Cov.	Pred.	Variables			Adjusted Means			R^2	df	F	Prob.	Find-ing
					A	B	C	R^2							
55:56	396	X ₂	X ₁	Group A, B,C	28.73	29.10	28.76	0.9129	0.9126	2/393	0.6844	0.5053	r.c		

are summarized as follows:

1. No significant difference in spelling achievement was found between the total experimental school and total control school.

2. No significant difference in spelling achievement was found between the experimental and control school at each grade.

3. There was a significant difference at the one per cent level of confidence in spelling achievement among the grades in the experimental school. Grade Four showed the smallest adjusted treatment mean and Grade Six showed the largest adjusted treatment mean and both were significantly different from all the others. The adjusted treatment means for Grade Two, Grade Three and Grade Five were not significantly different.

4. There was a significant difference at the one per cent level, in spelling achievement among the grades in the control school. The rank order of the treatment means was identical to that for the experimental school, except that the difference between the smallest and largest (Grade Four and Grade Six) adjusted treatment means was smaller for the control school.

5. No significant difference in spelling achievement was found between the two schools at each total group

level (A, B and C). However, the adjusted treatment mean for Group C favored the experimental school at 0.0892 level of probability.

6. No significant difference in spelling achievement was found between the two schools at each group level (A, B and C) within each grade except for Group A in Grade Three and Grade Six. In the former, the difference was in favor of the experimental school, whereas, in the latter it favored the control.

7. No significant differences in spelling achievement were found among the groups (A, B and C) in the experimental school.

8. No significant differences in spelling achievement were found among the groups (A, B and C) in the control school.

CHAPTER V

FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This study investigated the effects of grouping for differentiated instruction in the formal spelling program of the elementary school. Comparisons were made between schools at the school, grade, group, and group-grade levels. Further comparisons were made among the grades and groups in each school. The conclusions are based on the analysis of data given in Chapter IV. This chapter presents the findings regarding the eight hypotheses, the conclusions in the light of these findings, limitations of the findings, implications for the future elementary spelling program and recommendations for further research.

I. FINDINGS AND CONCLUSIONS

Hypothesis I. There is no significant difference between the experimental school and the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted. The adjusted mean was slightly higher for the experimental school but not significantly higher to warrant a rejection of the

hypothesis.

Conclusion. The findings lead to the conclusion that children in the elementary school will not do significantly better in spelling achievement under the grouping for differentiated instruction plan as defined in this study with its limitations than under the traditional approach as defined in this study. The findings tend to be in agreement with those of O'Leary¹ and Nixon² when comparing total groups on repeated list tests.

Hypothesis II. There is no significant difference between the experimental school and the control school in each grade in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted. The adjusted means were slightly higher for the experimental school at the Grade Two and Grade Three level, about the same at the Grade Four level, and slightly higher for the control school at the Grade Five and Grade Six level. However, none

¹O'Leary, loc. cit.

²Nixon, loc. cit.

of the differences were statistically significant.

Conclusions. Children at any grade level in the elementary program will not do significantly better in spelling achievement, when grouped for differentiated instruction as defined in this study with its limitations, than children under the traditional approach as defined in this study.

This would tend to support Lake's³ findings at the fifth-grade level but not support the findings of the fifth-grade study reported by Dawson.⁴

Hypothesis III. There are no significant differences among the grades in the experimental school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was rejected. The differences among grades in the experimental school were significant at the 0.00008 level of probability. The greatest significant difference at the one per cent level was between Grade Four with the smallest adjusted treatment mean and

³ Lake, loc. cit.

⁴ Dawson, loc. cit.

Grade Six with the largest adjusted treatment mean. For each of these grades the adjusted treatment mean was significantly different from all the other grades. The adjusted treatment means for Grade Two, Grade Three and Grade Five were not significantly different from one another.

Conclusion. The findings lead to the conclusion that given the type of treatment as outlined for the experimental school in this study and its limitations, Grade Six could be expected to make the greatest gain and Grade Four the least. Grade Two, Grade Three, and Grade Five could be expected to do about equally as well. One can only speculate as to why Grade Four made the least improvement.

Hypothesis IV. There are no significant differences among the grades in the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was rejected. The differences between grades in the control school were significant at the 0.00043 level of probability. The rank order of adjusted treatment means was the same as that for the experimental school, except that the difference between the smallest (Grade Four) and the largest adjusted treatment mean

(Grade Six) was smaller for the control school than the experimental school. The adjusted treatment mean for Grade Four was significantly different from all the other grades. The adjusted treatment mean for Grade Six was significantly different from all the others, except Grade Two, and the adjusted treatment mean for Grade Three was significantly different from that for Grade Two.

Conclusion. Given the same type of treatment and limitations as for the control school in this study, one can expect Grade Four to make the least improvement and Grade Six to make the most improvement in spelling achievement. There seems to be a plateau in spelling achievement at the Grade Four level in the elementary school. Again, one can only speculate as to why this should be so.

Hypothesis V. There is no significant difference between the experimental school and the control school for each group (A, B and C) in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted. Although the adjusted mean for Group A was not significantly different, it favored the control school at the 0.48 level

of probability. The adjusted means for Group B were identical for both schools. However, the adjusted means for Group C favored the experimental school at the 0.0892 level of probability.

Conclusions. The acceptance of the null hypothesis leads one to the conclusion that the different treatments, as defined in this study, administered to the various achievement levels in the elementary spelling program do not produce significant improvements in spelling achievement. However, although the difference between the experimental and control school in Group C was not statistically significant at the generally accepted five per cent level, the low achievers in spelling may be able to do better under the experimental treatment than the traditional approach. Perhaps, if the length of time for this study were increased, significant differences may have been achieved. The findings here for Group C seem to support those of O'Leary.⁵

Hypothesis VI. There is no significant difference between the experimental school and the control school for each group (A, B and C) in each grade in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test

⁵O'Leary, loc. cit.

IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted in all the comparisons, except for Grade Three (Group A) and Grade Six (Group A). In these two comparisons the null hypothesis was rejected. The adjusted mean was significantly different at the five per cent level only and favored the experimental school in the former. In the latter comparison, the adjusted mean was significantly different at the one per cent level in favor of the control school. Except at the Grade Two level, Group C had adjusted means which consistently seemed to favor the experimental school. In Group A and Group B at each grade level the adjusted means followed no consistent pattern.

Conclusion. The experimental treatment, grouping for differentiated instruction as used in this study with its limitations, does not produce significant differences in spelling achievement when compared with the traditional approach. Group C, however, seems to do better, although not significantly, under the grouping for differentiated instruction plan than under the traditional approach.

Hypothesis VII. There are no significant differences among the groups (A, B and C) in the experimental school in spelling achievement as measured by the post-test, Edmonton

Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted. The adjusted treatment means were not significantly different, but Group C had the largest mean and Group A the smallest.

Conclusions. The above findings lead one to the conclusion that there are no significant differences between the superior, average and low achieving spellers in spelling achievement even though there has been differentiation of instruction. However, although the differences are not significant, the poor spellers seem to improve at a faster rate than the superior and average spellers and, perhaps, this may be attributable to the treatment.

Hypothesis VIII. There are no significant differences among the groups (A, B and C) in the control school in spelling achievement as measured by the post-test, Edmonton Spelling Ability Test IV, using the pre-test, Test II, as a covariate control.

Findings. The null hypothesis was accepted. The adjusted treatment mean, although not significantly different, was largest for Group B. Means for Group A and Group C were almost identical.

Conclusions. The above findings lead to the conclusion that there are no significant differences among the superior, average and low achieving spellers in spelling achievement in the traditional approach. Group B seems to be profiting most from the traditional program but the difference was not significant.

II. LIMITATIONS OF THE STUDY

The author recognizes the following limitations which must be considered when interpreting the findings of this study:

1. The methods differences between the experimental school and control school were made up of clusters of methods rather than of single, definable variables. Therefore, significant differences in treatment where found, are not attributable to a single cause.

2. Since this study was carried on for only twelve weeks, the differences resulting from the experimental treatment may not have been detectable over such a short period of time.

3. Many of the benefits accrued to the superior spellers were not measurable by a single test such as the Edmonton Spelling Ability Tests because these students were involved in such activities as word meanings, origins, foreign

words, et cetera.

4. Improvements in spelling achievement for the superior spellers in Grade Five and Grade Six were difficult to measure because some of these students made near-perfect scores on the pre-test.

5. The two schools used may not have been in comparable socio-economic status, since the mean pre-test and post-test scores for the control school were higher than that of the experimental school.

6. The Edmonton Spelling Ability Series is not a recent publication, consequently, the tests may be out-dated in so far as measuring present-day spelling achievement.

7. Because the sample was chosen from one area of the city, it is possible that the results obtained may not be typical of a broader sample.

8. While every effort was made to insure standard procedures, the nature of the experiment left it open to much subjective interpretation, therefore, exact replication may be difficult.

III. IMPLICATIONS

The results of this study may prove useful to the classroom teacher and administrator who is concerned about various methods of teaching and organizing the spelling program.

Since the over-all treatment effects of the experimental school were not significantly different from the traditional approach, the grouping for differentiated instruction plan does give the teacher or administrator an additional method of teaching spelling. The experimental plan provides greater opportunities for providing for individual differences within the grade or classroom.

The patterns found among the grades in each school seem to suggest the necessity for re-assessing the total spelling program in order to find out why Grade Four is not doing as well as the other grades as evidenced in this study. One would expect each grade to make progressively greater gains from Grade Two to Grade Six.

A study such as this where all the teachers and administrators of the school are involved appears to be an excellent form of in-service training because it involves everyone. In this manner, teachers and administrators can be kept up-to-date on the current trends and new developments in the field of spelling and even the whole area of language arts.

Furthermore, any study such as this, helps stimulate interest and enthusiasm. Even though some of the results may prove to be insignificant, as in this study, the teacher who is interested and enthusiastic is the dominating factor in a

successful spelling program. This view is supported by Hildreth⁶ and Horn.⁷

IV. RECOMMENDATIONS FOR FURTHER RESEARCH

On the basis of the author's experience in this study, the following recommendations are offered for further research in the field of spelling.

1. A similar study of this nature should be done over a much longer period of time, say, one year. This could be the in-service project of the year commencing in September.

2. This study done with a very large sample might well help to control all the significant variations in method (e.g., inductive teaching, grouping practices) and content (e.g., enrichment activities, fewer words for remedials). Another advantage of a broader sample would be to gather more evidence on the relative achievement in spelling among the grades.

3. There is need for revision and up-dating of the present tests in the Edmonton Spelling Ability Manual to match the newly authorized texts in spelling.

4. There ought to be a study of the various

⁶Hildreth, loc. cit.

⁷Horn, loc. cit.

practices in the classroom regarding the use of the pre-test and post-test in the weekly spelling program. A well differentiated program in spelling may be dependent on the effective use of the pre-test and post-test.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Anderson, P.S. Language Skills in Elementary Education. New York: The MacMillan Company, 1964.

Anderson, V.D., P.S. Anderson, F. Ballantine and V.M. Howes. Readings in the Language Arts. New York: MacMillan Company, 1964.

Betts, E. Spelling Vocabulary Study - Grade Placement of Words in Seventeen Spellers. New York: American Book Company, 1940.

Bloom, B.S. Taxonomy of Educational Objectives, Classification of Educational Goals, Handbook I, Cognitive Domain. New York: David McKay Inc., 1964.

Chasnoff, R.E. Elementary Curriculum, A Book of Readings. New York: Pitman Publishing Corp., 1964.

Dawson, Mildred, Marian Zollinger and Ardelle Elwell. Guiding Language Learning. New York: Harcourt Brace and World Inc., 1963.

Dawson, M. Teaching Languages in the Grades. New York: World Book Company, 1951.

Dolch, E.W. Better Spelling. Champaign: Garrard Press, 1948.

Ferguson, G.A. Statistical Analysis in Psychology and Education. (Second Ed.) New York: McGraw-Hill Book Company, 1966.

Fernald, G. Remedial Techniques in Basic School Subjects. New York: McGraw-Hill, 1943.

Fitzgerald, J.A. The Teaching of Spelling. Milwaukee: Bruce Publishing Company, 1951.

Flower, G.E. (ed.) The MacMillan Spelling Series. Toronto: The MacMillan Company of Canada, 1961.

Foran, T.G. The Psychology and Teaching of Spelling. Washington: Catholic Education Press, 1934.

Greene, H.A., and W.T. Petty. Developing Language Skills in the Elementary Schools. Boston: Allyn and Bacon, Inc., 1963.

Hatchett, E.L. and Donald H. Hughes. Teaching Language Arts in Elementary Schools. New York: The Ronald Press Company, 1956.

Hildreth, G. Teaching Spelling - A Guide to Basic Principles and Practices. New York: Henry Holt and Company, 1956.

Horn, E. "The Curriculum of the Gifted; Some Principles and an Illustration," Twenty-Third Yearbook of the National Association for the Study of Education, Part I. Blooming-ton: Public School Publishing Company, 1924.

Keeping, E.S. Introduction to Statistical Inference. Toronto: D. Van Nostrand Company, Inc., 1962.

Kottmeyer, W. Teacher's Guide for Remedial Reading. St. Louis: Webster Publishing Company, 1959.

Kottmeyer, W., K. Ware and N.M. Purvis. Basic Goals in Spelling, Teacher's Edition. Toronto: McGraw-Hill Company of Canada, 1965.

McKee, P. Language in the Elementary School. Boston: Houghton Mifflin Company, 1934.

Piaget, J. Language and Thought of the Child. New York: Harcourt, Brace, 1926.

Pribram, K.H. "Neurological Notes on the Art of Educating," Theories of Learning and Instruction, N.S.S.E., Chicago: University Press, 1964.

Rinsland, H.D. A Basic Vocabulary of Elementary School Children. New York: MacMillan Company, 1950.

Russell, D.H. Characteristics of Good and Poor Spellers. New York: Columbia University, 1937.

Saucier, W.A. Theory and Practice in the Elementary School. New York: MacMillan Company, 1951.

Scottish Council for Research in Education, Studies in Spelling. London: University of London Press, 1961.

Shane, Harold G. "Grouping in the Elementary School," Elementary Curriculum, R.E. Chasnof, editor. New York: Pitman Publishing Corporation, 1964.

Shane, H.G., M.E. Reddin and M.C. Gillespie. Beginning Language Arts Instruction. Columbus: Charles Merrill Books Inc., 1961.

Shane, H.G., J.G. Mulry, M.E. Reddin and M.C. Gillespie. Improving Language Arts Instruction in the Elementary School. Columbus: Charles E. Merrill Book Inc., 1962.

Smith, B.O., W.O. Stanley and J.H. Shores. Fundamentals of Curriculum Development. Yonkers-on-Hudson, New York: World Book Company, 1957.

Strickland, R.G. The Language Arts in the Elementary School. Boston: D.C. Heath and Company, 1957.

Thorndike, E.L. The Teacher's Word Book. New York: Bureau of Publications, Teachers College, Columbia University, 1921.

Ward, J.H. "Multiple Linear Regression Models," Computer Applications in the Behavioral Sciences. Harold Borko (ed.). Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962.

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill Book Company, Inc., 1962.

Wolfe, D.M. Language Arts and Life Patterns Grades 2 through 8. New York: The Odyssey Press, 1961.

B. PERIODICALS

Artley, A.S. "Principles Applying to the Improvement of Spelling Abilities," Elementary School Journal, XLIX (November, 1948), 137-148.

Ausubel, D.P. "Cognitive Structure and the Facilitation of Meaningful Verbal Learning," Journal of Teacher Education, XIV (March, 1963), 217-222.

Bonney, K. "Sound and Sense in Spelling," Elementary English, XLII (March, 1965), 243-246.

Bremer, N.H. "Ways to Improve Spelling in the Elementary Schools," Elementary English, XXXVIII (May, 1961), 301-307.

Calhoun, R.T. "Comparison of a Typical and an Intensive Method of Teaching Spelling," Elementary School Journal, LV (November, 1954), 154-157.

Campanale, E.A. "Survey of Methods in Teaching of Spelling," Elementary English, XXXIX (May, 1962), 446-55.

Delacato, C.H. "Comparison of Two Methods of Teaching Spelling," Elementary English, XXIX (January, 1952), 26-30.

Eichholz, Gerhard C. "Spelling Improvement Through a Self-Check Device," The Elementary School Journal, LXIV (April, 1964), 373-376.

Fitzgerald, J.A. "Spelling Words Difficult for Children in Grades II-VI," The Elementary School Journal, LIII (December, 1952), 221-228.

_____. "The Teaching of Spelling," Elementary English, XXX (February, 1953), 79-85.

Fitzpatrick, W.J., and H.W. Zingle. "Sex Differences in Spelling in Canadian Children's Free Writing," The Alberta Journal of Educational Research, VI (December, 1960), 200-210.

Flower, G.E. "Research In Spelling - A Review," Canadian Research Digest, No. 3 (Summer, 1959), 97-111.

Freyberg, P.S. "A Comparison of Two Approaches to the Teaching of Spelling," British Journal of Educational Psychology, 34 (June, 1964), 178-186.

Furness, E.L. "Evidence on Phonics Instruction and Spelling Success," Clearing House, XXXI (January, 1957), 279-283.

Hanna, P.R., and J.S. Hanna. "Application of Linguistics and Psychological Cues to the Spelling Course of Study," Elementary English, XLII (November, 1965), 753-759.

Hanna, P.R., J.S. Hanna, S.R. Berquist, R.E. Hodges, E.H. Rudorf. "Needed Research in Spelling," Elementary English, XLIII (January, 1966), 60-66.

Hanna, P.R. and J.T. Moore, Jr. "Spelling-From Spoken Word To Written Symbol," Elementary School Journal, LIII (December, 1952), 329-337.

Hodges, R.E. "The Psychological Bases of Spelling," Elementary English, XLII (October, 1965), 629-635.

Hodges, R.E. and E.H. Rudorf. "Searching Linguistics for Cues for the Teaching of Spelling," Elementary English, XLII (May, 1965), 527-533.

Kyte, G.C. "When Spelling Has Been Mastered in the Elementary School," Journal of Educational Research, XLII (September, 1948), 47-53.

Lister, M. "Graphemic-Phonemic Correspondences as the Basis for Teaching Spelling," Elementary English, XLI (November, 1964), 748-752.

O'Reilly, R.C. "Phonics and Spelling," Elementary English, XLII (February, 1965), 126-127.

Petty, W.T. "Research Critiques," Elementary English, Partick Groff (ed.), XLII (May, 1965), 582-587.

Petty, W.T. and G.P. Plessas, "Spelling Program," Education, LXXXII (October, 1961), 80-82.

Plessas, G.P. and D.M. Ladley, "Some Implications of Spelling and Reading Research," Elementary English, XLII (February, 1965), 142-145.

Plessas, G.P. and W.T. Petty. "The Spelling Plight of the Reader," Elementary English, XXXIX (May, 1962), 463-465.

Rinsland, H.D. "Readiness for Spelling," Elementary English, XXVII (March, 1950), 189-191.

Rudorf, E.H. "Measurement of Spelling Ability," Elementary English, XLII (December, 1965), 892-894.

Russell, D.H. "A Second Study of Good and Poor Spellers," Journal of Educational Psychology, XLVI (March, 1955), 129-141.

Schoephoerster, Hugh. "Research Into Variations of the Test-Study Plan of Teaching Spelling," Elementary English, XXXIX (May, 1962), 460-602.

Sharpe, M.W. "A Comparison of Three Approaches to Teaching Spelling," Elementary English, XXXVII (May, 1960), 317-320.

Spache, G.D. "What's Wrong with Our Teaching of Spelling?" Education Digest, XXI (May, 1956), 49-51.

Strickland, R. "Utilizing Spelling Research," Childhood Education, XXXII (October, 1955), 69.76.

Theman, V. "Research Indicates More Effective Ways of Teaching Spelling," National Education Association Journal, XL (December, 1951), 607-608.

Underwood, B. "Forgetting," Scientific American CCX (March, 1964), 91-99.

Williams, R.M. "Methods for Teaching Spelling to a Group of Seriously Retarded Students," College English, XVI (May, 1953), 500+

Wise, C.T. "Selection and Gradation of Words in Spelling," Elementary School Journal, XXXIV (June, 1934), 754-766.

Yee, Albert H. "The Generalization Controversy on Spelling Instruction," Elementary English, XLIII (February, 1966), 154-161.

C. ENCYCLOPEDIA ARTICLES

Horn, E. "Spelling," Encyclopedia of Educational Research, C.W. Harris (ed.). New York: MacMillan, 1960, 1337-1354.

D. UNPUBLISHED MATERIALS

Arbeau, A.M. "A Survey of Pupil Grouping Practices in Grades I to XII in Alberta Schools," Unpublished Master's thesis, University of Alberta, 1963.

Burkhart, T.A. "The Effectiveness of Two Teaching Methods and Testing Procedures on Spelling Achievement," Dissertation Abstracts, XXIV (Nov. 1963). Unpublished Doctoral dissertation, University of Pittsburgh, 1963.

Hahn, W.P. "Comparative Efficiency of the Teaching of Spelling by the Column and Contextual Method," Unpublished Doctoral dissertation, University of Pittsburgh, 1960.

Ivany, J.W.G. "A Comparison of Expository and Hypothetical Modes of Teaching Science," Unpublished Doctoral dissertation, University of Alberta, 1965.

Lake, M.L. "A Comparative Study of Two Methods of Teaching Fifth Grade Spelling," Unpublished Doctoral dissertation, University of Florida, 1963. (Microfilm).

Newton, B.M. "A Study of Certain Factors Related to Achievement in Spelling," Unpublished Doctoral dissertation, University of Missouri, 1960. (Microfilm).

Nixon, K.D. "A Comparative Study of Individualized and Group Methods of Teaching Spelling," Unpublished Master's thesis, University of Alberta, 1965.

O'Leary, H.F. "An Experiment in a Small Group Plan For Spelling Instruction in the Intermediate Grades," Unpublished Doctoral dissertation, Ann Arbor, University of Connecticut, 1960. (Xeroc.)

Pavlak, S.E. "A Critical Analysis of Scientific Research in Spelling," Unpublished Doctoral dissertation, University of Pittsburgh, 1956. (Microfilms)

E. REPORTS AND BULLETINS

Department of Education, Program of Studies for Elementary Schools of Alberta. Edmonton: Curriculum Branch, 1965.

Franseth, J. "Research in Grouping," Grouping Children For Instruction in the Elementary School: A Conference Points the Way. U.S. Department of Health, Education, and Welfare, Office of Education. Reprinted from School Life, 1963 (June-July) OE-20062.

Hall, Robert A. Sound and Spelling in English. New York: Chilton Company, 1963.

Horn, E. Teaching Spelling. Washington: Department of Classroom Teachers, American Research Association, National Educational Association, 1954.

Kottmeyer, William A. "The Teaching of Spelling," (filmed reprint of closed television re-broadcast to Houston, Texas Teachers). St. Louis: Webster Publishing Company, 1959.

Piaget, Jean. The Stages of the Intellectual Development of the Child. Bulletin, Menninger School of Psychiatry, 1961.

Russell, D.H. Implications of Research for Canadian Classroom Practices, (Quance Lectures in Canadian Education). Toronto: W.J. Gage and Company Ltd., 1953.

Schonell, F.J. Essentials in Teaching and Testing Spelling. London: MacMillan and Company, 1958.

F. TEST AND TEST MANUALS

Ayres, L.P. A Measuring Scale for Ability in Spelling. New York: The Russell Sage Foundation, 1915.

Gates, Arthur I., H.D. Rinsland, I.C. Sartorius and C.C. Peardon, Teachers' Manual to Accompany The Pupils Own Vocabulary Spellers. Toronto: MacMillan Company of Canada, 1952.

Spelling Committee of the Edmonton Public School. Spelling Manual. Edmonton: Edmonton Public School Board, 1959.

APPENDICES

APPENDIX A

TESTS USED AND INSTRUCTIONS
TO TEACHERS

EDMONTON SPELLING ABILITY TEST

Edmonton Public Schools

TEST II

1. run	The boy can <u>run</u> a race.	run
2. red	The apple is <u>red</u> .	red
3. the	Is <u>the</u> rain falling now?	the
4. be	I shall <u>be</u> at home.	be
5. have	We <u>have</u> four apples.	have
6. food	This is good <u>food</u> .	food
7. day	Sunday is the first <u>day</u> of the week.	day
8. nine	She is <u>nine</u> years of age.	nine
9. seven	It is <u>seven</u> o'clock.	seven
10. meat	We ate <u>meat</u> for dinner.	meat
11. became	He <u>became</u> a great painter.	became
12. rich	A <u>rich</u> man has money.	rich
13. pole	That is a telegraph <u>pole</u> .	pole
14. led	He <u>led</u> the horse to the barn.	led
15. catch	Did you <u>catch</u> the ball?	catch
16. tiny	A mosquito is a <u>tiny</u> insect.	tiny
17. smoke	The <u>smoke</u> came from the chimney.	smoke
18. eight	It is <u>eight</u> o'clock.	eight
19. afraid	Are you <u>afraid</u> of my dog?	afraid
20. thunder	Did you hear the <u>thunder</u> last night?	thunder
21. extra	We had an <u>extra</u> book.	extra
22. aunt	That lady is my <u>aunt</u> .	aunt
23. address	What is your house <u>address</u> ?	address
24. enjoy	The children will <u>enjoy</u> the show.	enjoy
25. wrong	That is the <u>wrong</u> answer.	wrong
26. declare	The judge will <u>declare</u> the thief guilty.	declare
27. towel	Use a <u>towel</u> to dry your hands.	towel
28. visitor	She is a regular <u>visitor</u> to our house.	visitor
29. service	We listened to the church <u>service</u> .	service
30. motion	The car was in <u>motion</u> .	motion
31. telephone	Did you <u>telephone</u> for a taxi?	telephone
32. guess	I shall <u>guess</u> your age.	guess
33. succeed	To <u>succeed</u> one must work hard.	succeed
34. tobacco	He bought some cigarette <u>tobacco</u> .	tobacco
35. circular	A plate is <u>circular</u> in shape.	circular

36. meant	I didn't know what his speech <u>meant</u> .	meant
37. wretch	An unhappy person may be called a <u>wretch</u> .	wretch
38. principal	He is <u>principal</u> of that school.	principal
39. volunteer	Did you <u>volunteer</u> for army service?	volunteer
40. resources	Mines, forests, and soil are our natural <u>resources</u> .	resources
41. organization	Eaton's is a large selling <u>organization</u> .	organization
42. testimony	His <u>testimony</u> in court may convict the prisoner.	testimony
43. immediate	Give this matter your <u>immediate</u> attention.	immediate
44. peculiar	The kangaroo is a <u>peculiar</u> animal.	peculiar
45. decision	The umpire's <u>decision</u> was final.	decision
46. thoroughly	She was <u>thoroughly</u> disliked.	thoroughly
47. apologize	You must <u>apologize</u> for being impolite.	apologize
48. recipe	We have a <u>recipe</u> for plum pudding.	recipe
49. judgment	The boy's <u>judgment</u> was not reliable.	judgment
50. pneumonia	Is <u>pneumonia</u> a contagious disease?	pneumonia

EDMONTON SPELLING ABILITY TEST

Edmonton Public Schools

TEST IV

1. see	Do you <u>see</u> the book?	see
2. all	Shae gave away <u>all</u> her toys.	all
3. come	Will you <u>come</u> with me?	come
4. we	Should <u>we</u> work quietly?	we
5. over	Mary jumped <u>over</u> the box.	over
6. ride	We have a <u>ride</u> in their car.	ride
7. man	A <u>man</u> knocked on the door.	man
8. spent	He <u>spent</u> ten cents.	spent
9. two	He bought <u>two</u> candy bars.	two
10. noon	They went home at <u>noon</u> .	noon
11. lot	We bought a <u>lot</u> in the city.	lot
12. keep	Did you <u>keep</u> the money?	keep
13. teach	She will <u>teach</u> the music lesson.	teach
14. deep	The water in the pond is <u>deep</u> .	deep
15. soft	The cat has <u>soft</u> fur.	soft
16. travel	They will <u>travel</u> to the country.	travel
17. track	The train is on the <u>track</u> .	track
18. unless	Don't go <u>unless</u> you fell well.	unless
19. else	What <u>else</u> did you hear?	else
20. rather	I would <u>rather</u> stay at home	rather
21. automobile	He drove his <u>automobile</u> carefully.	automobile
22. provide	They will <u>provide</u> lunch.	provide
23. pleasure	Toys give children much <u>pleasure</u> .	pleasure
24. centre*	The meat was in the <u>centre</u> of the plate.	centre
25. retire	He will <u>retire</u> from his job.	retire
26. neighbour*	Our <u>neighbour</u> helped us.	neighbour
27. usual	Rain is <u>usual</u> during the summer.	usual
28. difference	What is the <u>difference</u> between two and four?	difference
29. theatre*	We went to the <u>theatre</u> today.	theatre
30. terrible	There was a <u>terrible</u> accident.	terrible

31. accident	A motor <u>accident</u> occurred on Main Street.	accident
32. adopt	They will <u>adopt</u> the child.	adopt
33. athletic	To be <u>athletic</u> one needs a healthy body.	athletic
34. foreign	Brazil is a <u>foreign</u> country.	foreign
35. separate	We will <u>separate</u> the milk from the cream.	separate
36. property	They bought some <u>property</u> in town.	property
37. dessert	For <u>dessert</u> we had ice cream.	dessert
38. distinguish	He will <u>distinguish</u> himself in sports.	distinguish
39. coarse	This sandpaper is very <u>coarse</u> .	coarse
40. volume	They bought a large <u>volume</u> of goods.	volume
41. publication	That paper is a daily <u>publication</u> .	publication
42. reference	The speaker made a <u>reference</u> to China.	reference
43. preliminary	We had a <u>preliminary</u> spelling test.	preliminary
44. mortgage	They paid part of the <u>mortgage</u> today.	mortgage
45. association	He joined a business <u>association</u> .	association
46. cemetery	She was buried in the <u>cemetery</u> .	cemetery
47. stationery	We bought some <u>stationery</u> for the office.	stationery
48. recommended	John was <u>recommended</u> for the job.	recommended
49. artificial	The firemen applied <u>artificial</u> respiration.	artificial
50. miscellaneous	We saw a collection of <u>miscellaneous</u> items.	miscellaneous

* Accept alternate spelling.

SPELLING ABILITY SCORES

AND CORRESPONDING LETTER RATINGS FOR

GRADES 2 to 8

GRADE	H	A	B	C	D
2	More than seven months above median	4 - 7 months Median plus or minus three months	4 - 7 months Median plus or minus three months	4 - 7 months Median plus or minus three months	More than 7 months Median plus or minus three months
3	More than 10 months above median	5 - 10 months Median plus or minus 4 months	5 - 10 months Median plus or minus 4 months	5 - 10 months Median plus or minus 4 months	More than 10 months Median plus or minus 4 months
4	More than 13 months above median	6 - 13 months Median plus or minus 5 months	6 - 13 months Median plus or minus 5 months	6 - 13 months Median plus or minus 5 months	More than 13 months Median plus or minus 5 months
5	More than 18 months above median	7 - 18 months Median plus or minus 6 months	7 - 18 months Median plus or minus 6 months	7 - 18 months Median plus or minus 6 months	More than 18 months Median plus or minus 6 months
6	More than 18 months above median	8 - 18 months Median plus or minus 7 months	8 - 18 months Median plus or minus 7 months	8 - 18 months Median plus or minus 7 months	More than 18 months Median plus or minus 7 months
7	More than 23 months above median	7 - 23 months Median plus or minus 6 months	7 - 23 months Median plus or minus 6 months	7 - 23 months Median plus or minus 6 months	More than 23 months Median plus or minus 6 months
8	More than 24 months above median	11 - 24 months Median plus or minus 10 months	11 - 24 months Median plus or minus 10 months	11 - 24 months Median plus or minus 10 months	More than 24 months Median plus or minus 10 months

TABLE OF NORMS*

(For All Forms of the Spelling Ability Tests Only)

<u>No. Correct</u>	<u>Grade Score</u>	<u>No. Correct</u>	<u>Grade Score</u>
1	1.6	26	4.6
2	1.7	27	4.8
3	1.8	28	5.0
4	1.9	29	5.2
5	2.0	30	5.4
6	2.1	31	5.6
7	2.2	32	5.8
8	2.3	33	6.0
9	2.4	34	6.2
10	2.5	35	6.4
11	2.6	36	6.7
12	2.7	37	7.0
13	2.8	38	7.2
14	2.9	39	7.5
15	3.0	40	7.8
16	3.2	41	8.1
17	3.3	42	8.5
18	3.5	43	8.8
19	3.6	44	9.2
20	3.8	45	9.7
21	3.9	46	10.0
22	4.0	47	10.5
23	4.1	48	11.0
24	4.3	49	11.7
25	4.5	50	12.5

*Grade Scores have been extrapolated for raw scores beyond 45 and below 14.

INSTRUCTIONS TO TEACHERS

Memo: To the Teachers (Grades II to VI)

From: A. Karvonen

Date: Jan. 24th, 1966.

1. Study. This is a three-month experiment in "Effects of Grouping for instruction in Spelling from Grade Two to Six". The project is to begin on January 24th, 1966, and end on April 29th, 1966.

2. Problem. Most elementary classroom teachers today seem to accept the idea of grouping for differentiated instruction in reading, because of the wide range of reading capability. There is general agreement among authorities in the language arts, that there is a high degree of correlation between reading achievement and spelling achievement. Therefore, it is reasonable to find just as wide a range in spelling capability as in reading. The recent Edmonton Spelling Ability Test results support this statement. Three grade six classes show a range from Grade 4.3 to 11.7 and the four grade two classes show a range from Grade 1.8 to 4.3. However, grouping for instruction in an attempt to cope with individual differences in spelling is often disregarded.

In practice we use the formal lists far too rigidly, assume every word needs to be studied separately with the same amount of emphasis and fail to make adequate provision for individual differences. Consequently, the above average students tend to become bored because they are studying words which most of them can spell correctly before study. The average plod along reasonably well, but the poor spellers are hopelessly frustrated. The poor spellers are given the same list without too much concern as to whether these words are useful, meaningful, or part of their spoken vocabulary. Consequently, many of these children who lack the necessary background develop poor attitudes, lose interest and lack motivation.

The techniques used in the recently authorized series emphasized the visual and the auditory with little emphasis on the kinesthetic. My contention is that all three approaches should be used in the classroom. Russell and Fernald have found that the poor spellers were usually weak in the visual recall but helped greatly by the auditory and kinesthetic. Fernald has also pointed out that we should avoid saying of the letters for the poor spellers because in the naming of the letters he must visualize. However, the visual approach needs to be strengthened as well but in a different manner.

In summary what seems to be needed is differentiating the program (list of words) and using a multi-sensory approach to help prevent spelling weaknesses.

3. Hypothesis. Children who are grouped according to spelling ability and receive instruction based on methods designed to treat specific needs and difficulties will improve in spelling ability at a faster rate than those children who have received instruction based on the one-group method using a common list of words.

4. Design. On the basis of the pupils achievement score in spelling as measured by the Edmonton Spelling Ability Test No. 2, each grade will be divided into three categories - A-superior, B-average, C-remedial, according to the following norms.

1. Grade 6 - Group A - 8.5 months and above

B - 5.5 to 8.4

C - 5.4 and below

2. Grade 5 - Group A - 7.5 months and above

B - 4.5 to 7.4

C - 4.4 and below

3. Grade 4 - Group A - 5.8 and above

B - 4.1 to 5.7

C - 4.0 and below

4. Grade 3 - Group A - 5.0 and above

B - 3.0 to 4.9

C - 2.9 and below

5. Grade 2 - Group A - 3.5 and above

B - 2.5 to 3.4

C - 2.4 and below

Instruction for the three groups is proposed in the following manner:

Group A will be given enrichment activities such as:

- 1) Exercise suggested for good spellers at the end of each lesson in the Kottmeyer series.
- 2) Exercises chosen from the suggestions for good spellers at the end of each lesson from the MacMillan Series.
- 3) Study the history of two words each week using the books provided.
- 4) Study three to five curriculum words, science, mathematics, social studies, etc.
- 5) Study foreign roots: Latin, Greek, French.
- 6) Study words of special interest - individual list.
- 7) Study more difficult prefixes and suffixes and notice effect on meaning when attached to word.

Group B. The average, will follow the regular work as outlined in the text being used.

Group C. Will study only about two thirds of the words in the regular lists. These words will be pre-selected on the basis of phonetic consistency and usefulness. Instruction for these students will be basically the Fernald technique as modified in the following manner:

- 1) Teacher writes the word on the chalkboard and says it while writing.
- 2) Pupil is asked to say word with teacher while looking at word. (Later on pupil may be asked to look at word in text using paper towel as marker).
- 3) Pupil looks at word, says it slowly and writes it with his finger on the paper towel.
- 4) Repeat step 3, look, say and trace slowly.
- 5) Pupil asked to "close your eyes when you think you have got it", say the word slowly as you trace it on the paper towel.
- 6) Pupil is asked to "open eyes and check. If you did not get it, repeat above steps" (Teacher may check by asking "hands up for those that didn't get it").
- 7) Try this with three or four words (at Grade Two and Three Level) or five or six words (at Grade Four, Five and Six levels).
- 8) Teacher now dictates above words. Instruct pupils to listen carefully because you will say word only once. Give next word quickly.
- 9) Recprd words giving trouble and have pupils study.
- 10) Superior students may assist in dictating words to the remedial spellers.

APPENDIX B

COMPARISON OF TOTAL PRE-TEST
WITH TOTAL POST-TEST

COMPARISON OF TOTAL PRE-TEST

WITH TOTAL POST-TEST

(i) Total Pre-Test = 26.9517, Total Post-Test = 28.0656

(ii) Difference in total Pre-Test and Total Post-Test
1.11 (N=808)

(iii) To test significance (Ferguson,¹ 2nd ed. 11.7,
p. 169)

$$\begin{aligned} t &= \frac{\bar{D}}{S_{\bar{D}}} \quad (11.8) \\ &= \sqrt{\frac{1.12}{\frac{10.5077^2 + 10.5178^2 - 2(.9522)(10.5077)(10.5178)}{808}}} \\ &= 10 \end{aligned}$$

(iv) Critical value of "t" required (.05) is 1.96

(v) Value of "t" found 10

(vi) Therefore difference in total Pre-Test and Total Post-test is significant.

¹G.A. Ferguson, Statistical Analysis in Psychology and Education (second edition). (New York: McGraw-Hill Book Company, 1966), p. 169.

APPENDIX C

RESOURCE MATERIALS USED
IN THIS STUDY

BOOKS

Anderson, P.S. Language Skills in Elementary Education.
New York: The MacMillan Company, 1964. pp. 152-199.

Collins, V.H. The Choice of Words: A Book of Synonyms with Explanations. London: Longmans, Green, 1952. 221 pp.

Ernst, Margaret. More About Words. New York: Knopf, 1951.
233 pp.

_____. Words. New York: Alfred A. Knopf, 1960. 115 pp.

Fernald, J.C. English Synonyms and Antonyms. New York: Funk and Wagnalls Co. 1914. 727 pp.

Funk, C.E. Thereby Hangs a Tale: Stories of Curious Word Origins. New York: Harper, 1950. 306 pp.

_____. A Hog on Ice and Other Curious Expressions.
New York: Harper, 1948. 214 pp.

Funk, W.J. Word Origins and Their Romantic Stories. New York: Harper, 1950. 432 pp.

Gove, Philip Babcock (ed.) Webster's New International Dictionary (3rd ed.) Springfield, Mass.: G. & C. Merriam, 1961.

Holt, Alfred H. Phrase and Word Origins. New York: Dover Publications, Inc., 1961. 254 pp.

Laird, D.C. and Helene Laird. The Tree of Language. Cleveland: World Publishing Co., 1957. 233 pp.

Shipley, J.T. Dictionary of Word Origins. New York:
Philosophical Library, 1945. 430 pp.

